

CONSOLIDATED DIRECTORY NUMBER

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MARCH, 1936

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★

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Division of  
Vought Aircraft Manufacturing Corp.  
East Hartford, Connecticut



Chief Photo © J. B. H. H. H.



# A YEAR OF ACHIEVEMENT



The well known aircraft artist, Gordon Knapp, has been given his conception of Howard Hughes' amazing the world speed record for land planes. The wings of this monoplaner, which averaged more than 312 m.p.h., are covered with Wellington Sears H.H. Heliolite Cloth.

During the past year, as during the sixty years preceding, Wellington Sears Company has substantially contributed to America's industrial progress. In the aeronautical industries, these contributions are readily discernible in the new records Wellington Sears Company has helped make possible.

In 1935, a new world speed mark was set for land-planes by Howard Hughes in his low wing monoplane. A Wellington Sears aeronautical fabric covered its wings. At last year's National Air Races, Benny Howard won both the Bendix and Thompson trophies—on wing surfaces covered with Wellington Sears Bada-30. At the same meeting, the Cessna C-34, adjudged the most efficient plane in the world, carried Wellington Sears wing fabric.

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# Vought Corsairs



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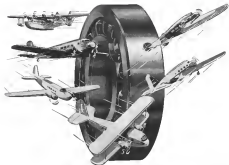
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The elimination of the vacuum bottle saves space, reduces weight and simplifies installation. Increased sensitivity and the reduction of lag make small deviations from level flight easily apparent. A Type 993 Climb Indicator is another of a new group of Pioneer Instruments announced this year. Others will be presented in the near future.

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3. 17 Airlines operating in or from the United States—including every major

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4. Every manufacturer supplying airplanes to either the Army or the Navy is a Fafnir user.

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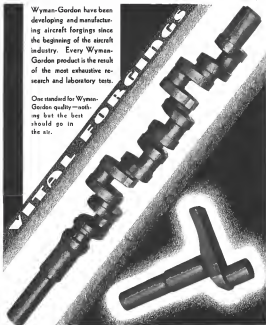


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### SIKORSKY AIRCRAFT

DIVISION OF UNITED AIRCRAFT MANUFACTURING CORPORATION, BRIDGEPORT, CONNECTICUT

# AVIATION

FOR MARCH 1936



## SHOW IN PRINT

• THE WEST COAST has had an aircraft show and it was a very creditable performance. We came away with more enthusiasm for such exhibitions than we have been able to drum up for many a year—an enthusiasm that was shared by most of the exhibitors. The feeling that "we're here because we're here," characteristic of some recent shows, was not in evidence at Los Angeles. Congratulations to the sponsors which we would but hesitate as the show squared well before opening. It was a good job.

Now with a new spring buying season just around the corner, Aviamart is having its own aircraft exhibition, a national show in print, a presentation of What's What in American Aeronautics. Included are the exhibitors at Los Angeles, plus every concern known to us that serves the aeronautical industry. We present to a desk-top, as a guide to all those interested in aircraft and accessories, a complete directory of the industry, including details and specifications for all aircraft and aircraft engines now commercially obtainable in America, and a survey of available materials, parts, and accessories.

AIRCRAFT  
ENGINES  
ACCESSORIES



**AIR TRANSPORT T. E. F.**

Air Transport Manufacturing Company,  
Windsor, Ont.

**AIRPLANES** with one, two, and four engines are offered by the Air Transport Manufacturing Company. The single engine T. E. F. is a known powered trainer. Specifications: number of seats, 2; horsepower, 150; gross weight, 1,650 lb.; useful load, 520 lb.; maximum speed, 130 mph.; (1,600 ft.); range, 400 miles.

The T. E. F. and T. E. F. models are two Wright Whirlwind powered, six place land or seaplane. Specifications are similar to seat, 6; horsepower, 250; gross weight, 3,000 lb.; useful load, (seaplane) 1,700 lb.; (landplane) 1,550 lb.; maximum speed, (seaplane) 140 mph.; (landplane) 190 mph.; at 7,000 ft.; range, (seaplane) 450 miles; (landplane) 300 miles. A three-engine version—the Model T. E. F., also available.

*Officers of the company are: R. E. McQuinn, president and general manager; H. A. Fisk, vice-president and chief engineer; R. N. Smith, secretary and treasurer; A. T. May, Jr., sales manager; and E. Cash, chief service manager.*

**AMERICAN EAGLET B-32**

American Eagle Aircraft Corporation, Kansas City, Mo.

**ONE** of the low-priced airplanes to survive the depression period is the American Eaglet. Together with the T. P. Eagle it has been in production continuously for several years. The airplane is the result of a merger between the Old American Eagle Aircraft Corporation and the Lincoln Aircraft Company, and it maintains records on all of their older still models.

Regular power for the Eaglet is the Selsky 55-54 four-cylinder 44 hp engine. Special features of equipment include a simple baggage stowage system and complete dual controls. Additional equipment is to increase in great variety. Special features include dual and hot, hot, hot, four cylinder motor, two seat cushions and washable.

Number of seats, 2; horsepower, 40; gross weight, 552 lb.; useful load, 412 lb.; maximum speed, 90 mph.; range, 250 miles.

*Officers are: Victor King, president; H. B. Spilhaus, vice-president; Frank R. Rupp, secretary; Victor H. King, treasurer; and W. F. Conner, chief mechanic.*

**ARCANAUT PIRATE**

Arcanaut Aircraft, Inc.,  
3010 Townsend, N. Y.

**A SOURCE** of discontinuance to the private flyer has been the recent scarcity of low-priced airplanes. Arcanaut Aircraft has set out to do something about it. Although designed primarily for the sportsman pilot, the Arcanaut Pirate has a wide breadth of purposes and applications in commercial operation. It has been designed for the Mexican Pacific C-4 engine (four-cylinder, converted, 125 hp) mounted as a pusher above the engine section.

The 54 is based on the cabin provides ample room for passengers to sit safely by side, but the seats are arranged in cross-bed formation side-by-side forward, a third seat behind.

Number of seats, 3; horsepower, 120; gross weight, 2,223 lb.; useful load, 805 lb.; maximum speed, 90 mph.; range, 500 miles.

*Officers of Arcanaut Aircraft, Inc., are: Leroy Nelson, president; Howard J. Rosenthal, vice-president and general manager; Joseph P. Miller, treasurer; Walter L. Smith, secretary.*

**BEECH B17L, B17R, B17R**

Beech Aircraft Company,  
Wichita, Kan.

**THE** smallest Beechcraft is the Model B17L, powered with the 225 hp Jacobs engine. General specifications: Number of seats, 4; horsepower, 225; gross weight, 2,340 lb.; useful load, 1,140 lb.; maximum speed, 175 mph.; (7,200 ft.) range 350 miles. Similar in dimensions to the Model B17R Beechcraft with 1-3 Jacobs. General specifications are: Number of seats, 4; horsepower, 265; gross weight, 2,350 lb.; useful load, 1,100 lb.; maximum speed, 177 mph.; at 7,200 ft. and range, 350 miles.

The Model B17 R Beechcraft is powered with a Wright Whirlwind 420 hp engine. General specifications: Number of seats, 4; horsepower, 420; gross weight, 3,600 lb.; useful load, 1,600 lb.; maximum speed, 207 mph.; at 8,000 ft.; and range 350 miles.

All single engine Beechcraft are of similar design and are distinguished by the important shape of their fuselage wing outline, fuselage landing gear and tail fin included.

*Officers of the Beech company are: William A. Guy, chief engineer.*

**BEECH MODEL 18**

Beech Aircraft Company,  
Wichita, Kan.

**STRIKELY** before the close of 1933 work began to spread around the industry that Beech had gone bankrupt and was developing an airplane to fit the leader line specifications had done for the Bureau of Air Commerce some years ago. About now, however, on this ship in bankruptcy but no longer it is to be a 6-8 place low wing type powered with engine rated at about 175 hp each.

The eight place touring arrangement is the one intended for service use while the alternate six place plane is for recreation flying. In the latter layout cabin facilities are provided at the rear of the cabin and the two passenger seats on the starboard side can be reclined by a switch.

Span dimensions have not been released but a cruising speed in the neighborhood of 165 m.p.h. and a single engine ceiling of 6,000 ft. are expected.

*Officers of the company are: William A. Guy, president; R. K. Smith, vice-president; G. A. Smith, secretary-treasurer; T. A. Smith, chief engineer; William A. Guy, chief engineer.*

**BELLANCA PACEMAKER**

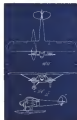
Bellanca Aircraft Corporation,  
Wichita, Kan.

**WHETHER** heavy load carrying or long range flying is to be done, Bellanca airplanes are likely to turn up. They have been used extensively in record making and in transatlantic flights. The number of the Bellanca makes the Super Pacemaker, a triplane, as a transport plane and as a freighter. The transport version is equipped with six seats, while the freighter model may be arranged for two or eight seats, depending on whether or not steps is to be normal. The engine is a Wright Whirlwind.

Latest editions of the Pacemaker models have been designed for improved performance as well as efficient transport. Among the recent members of these ships are General Airways, Ltd., of Toronto, Canada.

General specifications are: number of seats, 2 to 8; horsepower, 450; gross weight, 3,000 lb.; useful load, (transport), 2,200 lb.; (freighter), 2,000 lb.; maximum speed, 160 mph.; range, 600 to 1,200 miles.

*Officers of the Bellanca company will be found on page 24, column 2.*



See also specifications table on page 22

See also specifications table on page 23

**BELLANCA AIRCRUISER**

Bellanca Aircraft Corporation  
Wichita, Kan.

MORE THAN a dive-type G. M. airplane equipped a design team with a high wing, wing-folding type with internal bracing by strut braced enough to add to the lift of the airplane in a climb. This idea has been used in both the Procellular and Skyrocket models, but it fails to combine operation in the Aerobics in which the struts are folded into the lower wing, producing a clean, a streamline. The Aircruiser is available either as a biplane or a triplane and is powered with the Wright geared Cyclone. Its main operational application probably is the job it has to do for Mackinac Air Service, Ltd., of Edouville, Alberta, Canada, over a stretch of some 500-mile miles of unpopulated country between the railroad and the properties of the Edouville Mining Company.

General specifications of the Corps Aeroport are number of seats, 2; horsepower, 715 at 2,000 ft.; gross weight, 11,400 lb.; useful load, 5,200 lb.; maximum speed, 165 m.p.h. at 7,000 ft.; range, 1,000 miles.

**BELLANCA SKYROCKET**

Bellanca Aircraft Corporation  
Wichita, Kan.

A RECENT airplane type of the world by Dr. Richard U. Light of New Haven, Conn., brought into existence in the Bellanca Skyrocket model. The airplane and was the 111 Wright Whirlwind powered its last Skyrocket.

The newer model Skyrocket shown above is actually equipped with a Pratt and Whitney Model 541H engine rated at 550 hp at 5,000 ft. It is generally similar to the Firemaster model in its construction, design and performance.

General specifications are: number of seats, 6; horsepower, 550 at 5,000 ft.; gross weight, 1,000 lb.; useful load, 2,100 lb.; maximum speed, 190 m.p.h. at 3,000 ft.; service range, 500 to 1,000 miles.

Officers of the company include: C. M. Bellanca, president; N. S. Fox, chief pilot; and J. H. Fox, general manager. Other Bellanca aircraft include: Skyrocket, Bellanca model, 111; Skyrocket, Bellanca model, 111; Skyrocket, Bellanca model, 111; Skyrocket, Bellanca model, 111.

**BOEING 247-D**

Boeing Aircraft Company  
Seattle, Wash.

ALTHOUGH the Boeing 247-D is best known as the standard passenger transport equipment on United Airlines, it has been used extensively in other transport operations and, in some degree as a personal airplane for executives. The main difference between the Boeing 247-D and the predecessor, the Model 245, is found in the 247-D power plant. It carries the ground speeded-up 541H-G Pratt & Whitney Whirlwind engine of 550-hp, replacing the Model 245's 400-hp engine.

Specifications of the 247-D include: Number of seats, 12; horsepower, 550 at 5,000 ft.; gross weight, 15,000 lb.; useful load, 4,750 lb.; maximum speed, 208 m.p.h. at 5,000 ft.; range, 160 miles.

Officers of the Boeing Aircraft Company include: C. E. Gifford, president; Carlisle H. Cox, vice-president (executive); C. J. Mackay, vice-president and chief engineer; J. H. Murray, vice-president and chief engineer; H. E. Stevens, executive and instructor.

**BURNELLI UB-14**

Burnelli Aircraft  
Beverly, N. J.

THE FAMILIAR Burnelli design principle of combining an airplane fuselage in the form of an aerial section or characteristic of the latest UB-14 two-engine Burnelli. Major advantages claimed for this type of construction are the large volume per passenger and the economy of support in flight. The UB-14 A model is a complete redesign of the UB-14, an 111 Model 27 1750-hp Pratt & Whitney engines are used. The Burnelli UB-14 is of all-metal construction, using the standard one-piece aluminum alloy covering and extended fuselage construction technique.

Specifications of the UB-14 include: Number of seats, 14; horsepower, 1,700 at 7,000 ft.; gross weight, 18,000 lb.; useful load, 4,000 lb.; maximum speed, 225 m.p.h. (1,000 ft.); range, 300 miles.

Officers of the Burnelli Aircraft, Ltd., include: J. H. Gifford, president; J. H. Burnelli, vice-president; H. E. Stevens, vice-president; J. H. Murray, vice-president; J. H. Stevens, vice-president; J. H. Stevens, vice-president.

**CRUSADER AC-7**

Crusader Aircraft Corporation  
Denver, Colo.

THIS year's crop of two-engine designs has been exceptionally prolific. The Model AC-7, latest offering of Crusader Aircraft Corporation, differs from the others in that its tail is attached by hinges to wing struts adapted with a shock absorber effect. Having seats for seven persons, 28 m.p.h. of horsepower, and a 100-hp engine, it is equipped with a 100-hp engine. The tail is shock-absorbed and is equipped with a shock absorber and a shock absorber. The tail is shock-absorbed and is equipped with a shock absorber and a shock absorber.

Standard equipment includes eight wing-mounted and two engine-mounted automatic pilot and diving equipment are optional. Engines are 100-hp, six-cylinder Monsoons with 100-hp engines and controllable pitch propellers.

Specifications are: number of seats, 7; horsepower, 200 at 5,000 ft.; gross weight, 6,000 lb.; useful load, 3,400 lb.; maximum speed (indicated), 210 m.p.h. at 3,000 ft.; range, 350 miles.

**C-W COUPE 19-L**

Curtis-Wright Aircraft Company  
Paterson, N.J.

BUILT to meet the high speed requirements of the Bureau of Air Commerce, the Curtiss-Wright Coupe Model 19-L is the first all-metal aircraft to be produced in the Curtiss-Wright plant of Curtiss-Wright.

Throughout the development of the model emphasis has been placed on low operating and maintenance costs as well as low landing speed and ease of control. The plane is available with the Curtiss-Wright engine or the 145 hp Warner engine.

The body is of all-metal monocoque type of relatively heavy gauge 24 ST Alclad. The metal wing and the same material is built up around the main spar and main spar joints bolted together and also bolted directly to the fuselage.

General specifications are: number of seats, 2; horsepower, 90 to 145; gross weight, 1,750 to 2,200 lb.; useful load, 600 to 750 lb.; maximum speed, 111 to 167 m.p.h. and range (145 hp), 400 to 1,100 miles.

Officers of the company and its plant are: J. H. Stevens, president; J. H. Stevens, vice-president; J. H. Stevens, vice-president; J. H. Stevens, vice-president.



See the complete list of aircraft on page 24

See the complete list of aircraft on page 24



### C.W. CONDON

Curtiss-Wright Aircraft Company  
Auburn, Ala.

**FIRST** transport airplane to be employed as an air courier was the Curtiss-Wright Condor which has been in service for some time on several domestic routes, including American and Eastern. The Condor is among the airplane pioneers as a dayplane and courier passenger at night. Its most notable application is as a courier in the Fort Worth-Los Angeles branch of American Air Lines' transcontinental route.

When equipped as a shipper, the plane is divided into six compartments, each having two seats for day courier load upper and lower berths for night flights. The berth space is somewhat similar to that of a Pullman car, except that the lower berth is normally closer to the floor of the cabin.

General specifications are: number of seats, 16; horsepower, 1400 at 7300 ft.; gross weight, 17,300 lb.; useful load (dayplane), 6000 lb.; (night), 5,200 lb.; maximum speed, 150 mph.; at 8000 ft.; range, 650 miles.



### C.W. SPORT

Curtiss-Wright Aircraft Company  
Auburn, Ala.

**POWERED** with a 175 hp. Wright Whirlwind engine, the Curtiss-Wright Sport is the modern interpretation of the three-place open cockpit biplane in popular current times. The Sport is an unusual type single bay staggered biplane of conventional design and construction, having steel tube fuselage and wooden wings and tail surfaces with fabric covering. The usual seating arrangement for this type of ship is employed. Standard equipment includes compass, altimeter, air speed indicator, tachometer, oil pressure gauge, oil temperature gauge, gasoline gauge, standard adjustable propeller, navigation light, radio landing, fuel controls, dual air vent and baggage compartment.

Like all other Curtiss-Wright commercial models, the Sport is built at the Mobile Works plant.

General specifications are: number of seats, 3; horsepower, 175; gross weight, 2,000 lb.; useful load 750 lb.; maximum speed 155 mph.; and range about 350 miles.



### C.W. SPEEDWING

Curtiss-Wright Aircraft Company  
Auburn, Ala.

**THE DEMAND** for an airplane of unusual higher performance and slightly larger than the Sport has led to the construction of the Curtiss-Wright Speedwing, J-141, powered with the Wright Whirlwind engine. The Speedwing is similar in general design and construction to the Sport, but is available in several versions. A two-place de luxe model is offered in addition to the standard three-place version. The four cockpit can be closed in to accomodate two passengers when the ship is to be used as a single seater, or for cargo carrying purposes. The ship may be used for training, cross country, pleasure flying and a variety of purposes.

General specifications are: number of seats, 3; horsepower, 250-425; gross weight, 2,850-10,957 lb.; useful load, 950-3,000 lb.; maximum speed, 155-185 mph.; range, 300-450 miles.

Officers of the company are: G. J. Frenchworth, vice-president and general manager; E. S. Connor, secretary; G. M. Elbert, treasurer; and G. A. Page, chief engineer.



### AVIATION March 1936



### DOUGLAS DST, DC-3

Douglas Aircraft Company  
Santa Monica, Cal.

**WITH** airline passenger traffic on the increase, a ship that can carry nearly twice as many passengers at only slightly higher operating cost than that of existing equipment is very likely to find a large market. Such an airplane is the new Douglas Transport which is available as a shipper (Model DST) or as a 34-passenger day plane (Model DC-3). The new Douglas looks very much like the DC-3 and is available with either the G or new Wright Cyclone engine or Pratt & Whitney twin row Vamp of the 1000 type.

Orders have been placed for three ships by American and United.

General specifications of the Douglas DST and DC-3 transport are: number of seats, 28 day plane (38 berths); horsepower, 2400 to 3200 at critical altitude; gross weight, 24,500 lb.; useful load, 12,750 to 15,000 lb.; maximum speed at critical altitude, 232 to 258 mph.; range (maximum 14,000 ft.) 2,450 to 2,650 miles.

Officers of the Douglas Company will be found in column 2.



### DOUGLAS DC-2

Douglas Aircraft Company  
Santa Monica, Cal.

**ONE** of the transport planes that took an important part in showing operators the way to performance and profits is the Douglas DC-2. These ships are now in use on TWA, American Airlines, Pan American Airways, Eastern Air Lines, and a number of other operators in this country and abroad. More than 125 of them have been produced and the company still has orders for more.

The DC-2 is of all metal this means construction with corrosion wing and desirable loading range. It is available with either Wright Cyclone or Pratt & Whitney Hornet engines.

General specifications of the DC-2 are: number of seats, 16; horsepower, 1,425 (2,000 ft.); gross weight, 12,500 lb.; useful load, 6,250 lb.; maximum speed 206 mph (14,000 ft.); and range, 1,225 miles.

Officers of the Douglas Company are: Donald W. Douglas, president; Harry Merritt, vice-president; Carl Green, vice-president in charge of sales; Arthur Raymond, chief engineer; T. C. McElroy, secretary; and H. F. Drake, treasurer.



### FAIRCHILD F-45

Fairchild Aircraft Corporation  
Dayton, Ohio

**IT HAS BEEN** a good many years since a low-wing landplane has seen unusual production and has been known by the name of Fairchild, but in the summer of 1935 a ship of this type, having all the latest improvements of a high speed landplane, made its appearance. Power plant is the Wright R-1820A, 250 hp., seven-cylinder radial engine.

First of these ships to be built has been placed in operation service by the Southern Ohio Company of Houston, Tex.

Equipment includes retractable landing gear and flap of the split tail-rudder type, extending across the trailing edge between ailerons. Admittance ratings also are provided in the data.

General specifications for the Fairchild F-45 are: number of seats, 3; horsepower, 250 at sea level; gross weight, 4,000 lb.; useful load, 1,375 lb.; maximum speed, 171 mph at sea level; range 675 miles.

Officers of the company are listed on page 25, column 2.



See also specifications table on page 26

See also specifications table on page 26



### FAIRCHILD AMPHIBIAN

Fairchild Aircraft Corporation  
Burlington, Md.

**M**ANAGERS, based, will start to action four days of air travel from New York City, finally to the Fairchild 24 ("Baby Clapper," recently delivered to Pan American Airways for service on the 1000-mile London River run between Paris and London. Schedule here of this run will be reduced from 10 to 4½ hours by the use of the new Clapper. The power plant is a Pratt & Whitney Hornet rated at 700 hp.

A second Clapper ship of this type powered with a 700 hp Wright Cyclone is to be delivered to Pan American in the near future for use in scheduled service on the Vancouver River to China.

The Fairchild Amphibian is a high performance type having a useful load equivalent to about 40 per cent of its gross weight.

General specifications are: number of seats, 3; horsepower, 140; gross weight, 2,600 lb.; useful load (Warner) 925 lb.; (Ranger) 804 lb.; maximum speed (Warner) 120 m.p.h.; (Ranger) 112 m.p.h.; range (Warner) 410 miles; (Ranger) 375 miles.



For this question see page 28

### FAIRCHILD 24

Fairchild Aircraft Corporation  
Burlington, Md.

**T**HE SMALLER open and closed Fairchild amphibians have been used extensively in instruction, charter and other activities of four service operations. The closed model, known historically as the Fairchild 26, comes equipped with either the Fairchild Ranger mounted radial engine, or the Warner Super-Turbo radial. General dimensions and construction of these two models are similar and the speed of the ship with the specified in-line engine is slightly higher than that of the radial for the same horsepower rating.

Among the well known pilot-owners of ships of this type are Captain Louis J. Jansie, Topole, Super Waile Kula and J. Spenser Lock and four other operators at Aniak, Alaska.

General specifications are: number of seats, 3; horsepower, 140; gross weight, 2,600 lb.; useful load (Warner) 925 lb.; (Ranger) 804 lb.; maximum speed (Warner) 120 m.p.h.; (Ranger) 112 m.p.h.; range (Warner) 410 miles; (Ranger) 375 miles.



### AVIATION MARCH 1936



### FAIRCHILD 22

Fairchild Aircraft Corporation  
Burlington, Md.

**W**HEN Louis de Plan, veteran Alaska pilot, made his debut last on a new aerial system of blind flying which he has been developing, he introduced the operation in his Fairchild 22 and made a number of flights with James B. Taylor, Jr., as his check pilot. Reports of this 10th year discovery at the recent meetings of the Institute of the Aeronautical Sciences. Other owners of Fairchild 22 include Robert Lusk, Denver Road Bus Center, and Captain Henry Manning.

Wings, ailerons and tail surfaces of the 22 are similar in design to those used in the 24.

General specifications are: number of seats, 2; horsepower, 110; gross weight, 2,100 lb.; useful load, 850 lb.; maximum speed 115 m.p.h.; range, 750 miles.

Officers of the Fairchild Aircraft Corporation are: Sherman M. Fairchild, president; L. E. Schmitt, vice-president; W. H. Schmitt, vice-president; Lee Miller, secretary; W. F. Zander, treasurer; and P. Fland, assistant secretary and historian.

### AVIATION MARCH 1936



### KELLETT KD-1

Kellett Aircraft Corporation  
Philadelphia, Pa.

**T**HE KELLETT direct control airplane, model KD-1, has been substantially improved in detail and is now considerably versatile. Anticipating the possibility of jump take-off, the mechanism that transmits the load from the engine to the rotor system for starting has been designed to withstand stresses considerably greater than those encountered in all other multi-engine ship for normal take-off. Mechanical details of the improvements in the Kellett machine were described in the December, 1935 issue of AVIATION, page 22.

The first of these ships is now at Langley Field for tests by the U.S.A.C.A.

General specifications are: number of seats, 2; horsepower, 225; gross weight, 2,075 lb.; useful load, 900 lb.; maximum speed, 125 m.p.h.; range, 800 miles.

Officers of the company are: W. Kellett, president; C. T. Lamb, vice-president; R. G. Kellett, secretary; W. R. Jones, chief engineer; R. M. Fennell, assistant engineer.



### KINNER INVADER

Kinner Aircraft & Motor Corporation  
Burbank, Cal.

**A** BRIGHT design that marks the entrance of the Air Controlling Bureau's single line plane specifications is the Invader, first twin engine ship to be offered by the Kinner Aircraft & Motor Company, Ltd. A one-weight plane takes this the Invader has a conventional welded steel tube fuselage and a one-piece plywood covered fuselage wing. The cabin is mounted on a steel frame with a built-in ventilation system. A compartment for luggage in the rear is provided and a temporary compartment is located at the rear of the cabin. Reinforced landing gear has been designed so that in case of complete failure of the existing mechanism, it will lower by its own weight to a landing position. Below the gear door, an extreme pointer to the other shifts the up only 0.3 inch.

Specifications for the standard one plane model are: seats, 8; horsepower, 240 (5,000 h.p.); gross weight, 4,500 lb.; useful load, 2,200 lb.; maximum speed, 150 m.p.h.; range, 600-1,500 miles.



For this question see page 28



### KINNER SPORTWING

Kinner Aircraft & Motor Corporation  
Burbank, Cal.

**K**INNER airplanes may be classified in three distinct groups as open and closed single engine ships and the twin-engine Invader. Three open models are available—the K-Sportwing, 180 hp. K-3 engine, the D-Sportwing, with 125 hp. D-3 engine, and the D-2-R Sportwing with 80 hp. series 2 engine rated at 180 hp. The Sportwing (illustrated above) is of conventional construction and design, having a steel tube fuselage, wooden wing structure and fabric covering.

Standard equipment includes adjustable seat, upholstered glass windshield, fibercord upholstery, battery, wing over and landing. Basic equipment, radio does steel propeller, cockpit cushions, adjustable landing lights, etc. The Sportwing is also available with 125 hp. Kinner engine.

General specifications are: number of seats, 2; horsepower, 100; gross weight, 2,175 lb.; useful load, 775 lb.; maximum speed, 152 m.p.h.; range, 375 miles.

Officers of the Kinner Corporation will be found on page 40, column 2.



**KINNER ENVOY**

*Lowest Alphabet & Motor Corporation  
Winchester, Ore.*

OF the two low-wing cabin monoplanes offered by the Kinner company, the Envoy is the larger. It is a four-place machine powered by the Kinner SC-7 engine, rated 250 hp., at 5,500 ft. Highest in performance of the Kinner single engine monoplanes is the Envoy, has a 170-mile cruising range, an unusually high figure for airplanes in the same class. Whisker landing lights reduce the need of adjustable indicators and wing flaps are provided to reduce landing speed. In addition to the usual array of equipment, a radio receiving set is included as standard. A controllable pitch propeller may be fitted as optional equipment.

One of the first of the Envoy to be built was purchased for the Bureau of Aeronautics of the Navy Department for high-speed executive and transport service.

General specifications are: number of seats, 4; horsepower, 250 at 5,000 ft.; gross weight, 4,500 lb.; useful load, 1,400 lb.; maximum speed, 180 m.p.h.; (2,000 ft.); range, 200 miles.

**KINNER PLAYBOY**

*Lowest Alphabet & Motor Corporation  
Winchester, Ore.*

THIS smaller of the closed single-engine ships offered by Kinner is the Model K. Playboy with Kinner Series B-3 Kinner engine. The Playboy has aileron for roll control and is of conventional construction. The fuselage is a rectangular structure of welded steel tubing, skinned in six solid sections and covered with fabric. Wing struts are integral with the fuselage and provide one of most convenient tail structures in all welded steel tubing. Like all the other Kinner models it is fitted with tail controls on the elevators for longitudinal trim.

The Playboy is suitable for pleasure flying, instruction, and a number of land line applications.

General specifications are: number of seats, 2; horsepower, 340 gross weight, 4,250 lb.; useful load, 700 lb.; maximum speed, 160 m.p.h.; range, 360 miles.

Office of the Kinner Aircraft & Motor Corporation are Robert Purdy, president; R. C. Grier, vice-president; Roy D. Rapp, secretary-treasurer; C. P. Sander, chief engineer.

**MONOCOUPÉ MODEL 93**

*Lockhart Aircraft Corporation\*  
Berkeley, Cal.*

A LTHOUGH the Lockhart Aircraft Corporation is expanding its line of ships to include various low wing designs, it is still maintaining where production of the Lockhart Monocoupe Model 93 and its base 93A. The high wing Monocoupe has been popular for several years in the field of land line ferries. The present plane is currently the Lockhart 250 radial engine rated at 90 hp. at sea level. Wood parts and full K.A.C.A. construction are included in the standard equipment. General equipment includes: dual master, electric, magnet battery; landing lights, radio, radio-Sperry radio, and Sperry. Sperry is provided on the instrument board for the usual instruments necessary for blind flying. The cockpit is fixed seat longitudinal type is obtained by a small sub-structure.

General specifications are: number of seats, 2; horsepower, 90; gross weight, 1,650 lb.; useful load, 660 lb.; maximum speed, 120 m.p.h.; range, 600 miles.

\*Office of the company are located page 32, column 1.

**MONOPREP, MONOSPORT**

*Lockhart Aircraft Corporation\*  
Berkeley, Cal.*

WHEN A. W. Wherry became chief engineer of the Lockhart Aircraft Corporation, it was only natural to expect that something would be done along the high wing tradition of Monoprep by the man who had been a pioneer designer of low wing monoplanes in Stockton, Cal. The only question was whether the company would continue to make high wing planes after the inevitable low wing models were introduced. The answer is that Lockhart is going to offer both the familiar Monocoupe 93 and a brand new low wing Monoprep and Monosport, both two-place open-cockpit low wing monoplanes.

General specifications of the new series of ships are: number of seats, 2; horsepower, 90; gross weight, 1,550 lb.; useful load, 580 lb.; maximum speed (Monoprep), 120 m.p.h.; Monosport, 120 m.p.h.; range, 500 miles.

Office of the company are: C. P. Purdy, president; J. P. Rapp, vice-president; R. C. Grier, treasurer; C. P. Sander, chief engineer; and A. W. Wherry, chief engineer.

**LOCKHEED 12**

*Lockhead Aircraft Corporation\*  
Berkeley, Cal.*

THE BRIGHTEST of 1935 brought reports of several new designs to fit the Department of Commerce order line equipment specifications and one of these was the Model 12-A. Lockheed a similar variant of the Electra. Four variants are to be available. Model 12-A will be powered by two Pratt & Whitney Wasp 3-303 engines having 450 hp. available for take-off, 300 hp. for cruising. Wright Whiskered engine, Model 6075-K, will be used for Model 12-B developing 440 hp. for take-off, 300 hp. for cruising. As the latest development, the non-cylinder Wright Whiskered engine will be used in Model 12-F. In-line engines are included for Model 12-M, to be powered with two six-cylinder Motormen.

Specifications for the Model 12-A are: number of seats, 4; horsepower, 900 (cruising); gross weight, 7,620 lb.; useful load, 2,250 lb.; maximum speed, 230 m.p.h. at 5,000 ft.; range, 950 miles.

\*Office of the company will be listed on page 32, column 2.

**LOCKHEED ELECTRA**

*Lockhead Aircraft Corporation\*  
Berkeley, Cal.*

EQUIPMENT modernization programs of the scheduled airline companies, created a demand for a large number of Lockheed Electras in 1935. And among those who added them to their fleets were Eastern, Delta, Northwest, Pan American and a number of others.

The principal transport application of the Electra is in the local service of the major airlines where frequent stops are made, but a high performance all-around ship, having a low operating cost is required.

Lockhead Electras are available with either Pratt & Whitney Wasp or Wright Whiskered engines. Model 12-A uses the Wasp 3-303 at 2,200 hp., Model 12-B a Wasp 3-303 at 150 hp. at 2,200 rpm. The Model 12-E is powered with Wright Whiskered engine rated 440 hp.

General specifications are: number of seats, 12; horsepower, 900-1,100; gross weight, 30,000 to 32,000 lb.; useful load, 1,400 to 3,275 lb.; maximum speed, 200 to 275 m.p.h. and range 800 to 435 miles.



See also specifications table on page 32

See also specifications table on page 32





### ORION, ALTAIR

Lockheed Aircraft Corporation  
Burbank, Cal.

**B**ETORE the Lockheed Corporation sets the production in metal aircraft, the following Orion was automatically selected for high speed transport service. The Orion and the closely related Altair continue to be available among the single engine offerings of the Lockheed Company. They have been and will continue to be in the rotary and straight in a number of airline operations.

Powered by the Pratt & Whitney R-1120 Whop (290 hp at 2,800 ft.) the Orion is a modern four-engine configuration and has accommodations for six passengers.

Both the Orion and Altair are equipped with combination cable and hydraulically operated retractable landing gear. Flaps serve the wheel wells when the gear is in retracted position.

General specifications are: number of seats, 24; horsepower, 110 at 2,800 ft.; gross weight, 3,500 lb.; useful load, 1,340 (2,230 lb.); maximum speed, 220-225 mph (3,000 ft.) and range, 340-375 miles.



### VEGA MODEL 5G

Lockheed Aircraft Corporation  
Burbank, Cal.

**W**ESTVIEW of any former flight is the Lockheed Vega, Model 5-G, whose origin dates back to the early efforts of Altair and Altair Longhead when they plan was located in Hollywood. The Vega is a high wing monoplane of a modern construction with monocoque structure powered by the 430 hp. (2,800 ft.) Pratt & Whitney Whop 3001 engine. The Vega has been and continues to be an executive ship and as a variety of unusual arrangements. One of the most famous Vegas is the Wayne Mac from the late Wiley Post.

General specifications are: number of seats, 7; horsepower, 430 at 2,800 ft.; gross weight, 4,250 lb.; useful load, 1,500 lb.; maximum speed, 170 mph at 6,000 ft.; normal range, 340 miles.

Officers of the Lockheed Aircraft Corporation are: Robert E. Gault, president and treasurer; Carl D. Spartz, vice-president and sales manager; Cyril Caspary, secretary; Wm. A. Walcott, chief engineer; and Richard von Holst, factory superintendent.



### LUSCOMBE PHANTOM

Luscombe Aircraft Development Corporation  
Mesa, Ariz.

**W**HEN the aviation imagination of D. A. Luscombe was merged with the design ability of Don H. Briggs, the result was the Luscombe Phantom, a high performance two-place all-metal ship intended primarily as a quality product and constructed without the consideration of cost. The first of these ships, built at Kansas City, Mo., and powered with the 125 hp. Warner Super-Six engine, sold for about \$2,300. Recent efforts of the company have been directed towards increased production and reduced cost. Other price plans with engines as low as 70 hp. can be used in the Phantom.

The ship was in low pricing into production as an new factory in Warner airport where a factory and mechanics school is being operated.

General specifications are: number of seats, 2; horsepower, 145; gross weight, 1,500 lb.; useful load, 650 lb.; maximum speed 140 mph; range 300 miles.

Officers of the company are: D. A. Luscombe, president; Don H. Briggs, chief engineer.



### MARTIN 130

The Omega & Martin Company  
Baltimore, Md.

**D**EVELOPED in cooperation with Pan American Airways for the existing requirements of the Transoceanic Service, the Martin 130 Ocean Transporter is the largest thing built that has been built in America. She has been a landmark in performance of this design which has a certainly remarkable combination of speed and range.

Two of the three ships ordered by Pan American are now in regular service between San Francisco and Manila over the newly established airway across the Pacific.

General specifications of the Model 130 Ocean Transporter are: number of seats, 12; (or 12 berths); horsepower, 1,500 (2,000 ft.); gross weight, 11,000 lb.; useful load, 3,200 lb.; maximum speed, 180 mph at 8,000 ft. and range, 3,500 miles.

Officers of the Omega & Martin Company are: Glen E. Martin, president; Lucius C. McNamee, vice-president; M. C. Skid, secretary; J. J. Jones, secretary; F. T. Hartman, chief engineer; and B. C. Krohn, chief engineer.



### NORTHROP DELTA

The Northrop Corporation  
Dayton, Ohio

**W**HEN PASSENGER, cost of associated transportation requires high speed single engine transport, one is likely to find Northrop's solution. All models employ the characteristic monocoque construction and are equipped with split wing flaps.

The Delta is available in several sizes. As a transport plane it can be used as a single pilot ship for eight passengers or a two pilot ship for six passengers. In both of these models, the pilot's compartment is forward. When equipped as a mail plane, the pilot's compartment is at the rear, and a cargo capacity of 275 cubic is provided forward. This model is available for either single control or tandem dual control. The two-pilot version has 150 cubic ft. of cargo space.

General specifications are: number of seats, 1 to 8; horsepower, 710 (2,000 ft.); gross weight, 7,700 lb.; useful load, 2,200 lb.; maximum speed, 225 mph at 10,000 ft.; range, 1,500 miles.

Officers of the company are: David C. Northrop, president.



### NORTHROP GAMMA

The Northrop Corporation  
Dayton, Ohio

**T**HE SPECTACULAR performance of the Northrop Gamma has attracted much attention recently. A short time ago a new transcontinental record was established by one of these ships by Howard Hughes when he flew from Los Angeles to New York in 5 hours and 37 minutes.

The Gamma is a single pilot ship with a 110 cubic compartment forward that can be used for cargo or special accommodations. Normal power plant is the Wright Cyclone 854-10, 150 rated 500 hp at 2,100 ft.

General specifications are: number of seats, 1 to 2; horsepower, 750 (2,000 ft.); gross weight, 7,700 lb.; useful load, 2,200 lb.; maximum speed, 225 mph at 10,000 ft.; range, 1,500 miles.

Officers of the Northrop Corporation are: John E. Northrop, president; W. K. Day, vice-president and treasurer; F. C. Whitman, secretary; W. K. Day, chief engineer; John E. Northrop, chief engineer; Donald Douglas, H. H. Arnold, H. L. Liverett, assistant.



See also specifications table on page 33

See also specifications table on page 33

**PITCAIRN XOF-2**

Pitcairn Aircraft Company  
Wichita, Kans., Pa.

ALTHOUGH the Army and the Navy both have conducted new development studies from Pitcairn Aircraft Company, the same general type of craft with minor modifications is to be available commercially.

The latest and largest of the airplanes is of commercial construction and will be equipped with the 100-hp. Lycoming engine in 1936 as it is ready for commercial use. A Wright Whirlwind engine is used in the Army ship. The new "modular airplane" under development by the Aviation Company of America has been designed so that it can be driven on the highway. It is described on page 96.

Specifications for the Pitcairn Army airplane are: number of seats, 2; horsepower, 40; gross weight, 3,238 lb.; useful load, 950 lb.; maximum speed, 90 m.p.h.

Officers of Pitcairn Company are: Donald F. Pearson, president and treasurer; Raymond Pitcairn, vice-president; James C. Noy, vice-president; R. C. Allen, secretary; Agnes Lucas, chief engineer.

**PORTERFIELD 35, 35-70**

Porterfield Aircraft Corporation  
Kansas City, Mo.

A 1000-C class high two-place ship priced below \$1,000 is the Porterfield which sells at \$1,055 and is available with either the Lycoming 45-hp engine or the Lycoming 35-hp unit. The Porterfield is intended in that the other seats are arranged in tandem. Large windows and a transparent panel in the wing provide good vision for the occupants of both seats. The ship has a maximum weight allowance of 52 lb. flammant in eleven gasoline A/V tanks with an without fuel.

Porterfield ships have been sold extensively in field law operations. General specifications (M 20) - number of seats, 2; horsepower, 35; gross weight, 1,605 lb.; useful load, 267 lb.; maximum speed, 115 m.p.h. in 700 ft. range, 300 miles.

Officers of the company are: R. E. Porterfield, Jr., president and general manager; Max E. Porterfield, Jr., vice president; V. E. Moschler, secretary; Edgar J. Smith, Jr., sales manager; M. W. Brown, chief engineer.

**BEARWIN 7000, 8500**

Bearwin Aircraft Corporation  
Kansas City, Mo.

THIS PRESENT Bearwin has one class of two models, one of which are two-place, open cockpit, and the fourth a three-place open cockpit. The Models 7000 and 8500 are identical in dimensions, size and gross weight and differ only in power plants and armament. The 7000 is powered with the Lycoming 45-hp engine at 70 hp and the Model 8500 is powered by the Lycoming 55-hp rated 85 hp and sells for \$2,775 in comparison with \$2,085 for the lower powered model. There is about 2 mph difference in top speed performance between these two models.

Both of these ships have conventional wood and fabric construction, have also spring shock absorbers for the landing gear and are supplied with either radial or tail wheels.

General specifications are: number of seats, 2; horsepower, 35 to 45; gross weight, 1,400 lb.; useful load, 350 to 380 lb.; high speed 113 to 118 m.p.h. at 800 ft. and range 420 miles. Officers of the company will be listed on page 11 column 1.

**BEARWIN 6000**

Bearwin Aircraft Corporation  
Kansas City, Mo.

HIGHER in price and performance than the model 7000 and 8500 is the Bearwin 6000, powered with an American Ceevee engine. Although similar to the others in design and construction, the Model 6000 is slightly smaller and heavier than the other Bearwin models. The Bearwin 6000 is known formerly as the "Speed Star," while the model engine ship is called "Sportstar."

The three-place open cockpit model made by Bearwin is the No. 3000-C powered with 185 hp. Ceevee Challenger engine and having a high speed of 140 m.p.h. at 5,000 ft.

General specifications of the Model 6000 are: number of seats, 2; horsepower, 65; gross weight, 1,665 lb.; useful load, 410 lb.; maximum speed, 140 m.p.h. at 800 ft. and range 460 miles. Officers of the company are: R. A. Brown, president; Albert E. Jones, vice president; Kenneth R. Brown, sales manager and treasurer; Kruse P. Brown, secretary; William Henry Brady, chief engineer.

**RYAN ST**

Ryan Aircraft Company  
Los Angeles, Cal.

A general evaluation of different commercial biplanes, land and water types is found in the most recent product of the Ryan Aircraft Company—the Ryan ST. The ST is a two-place tandem low-wing monoplane of clean design, powered with the 60 hp. Menasco engine. A new type of landing gear with long travel also shock absorbers and Goodrich wheels and brakes are used. Wing brace and elevator struts are not included in the design. The Ryan ST has been extensively evaluated as a ship for private owners and field law operations because of its high performance for low power.

General specifications of the ST are: number of seats, 2; horsepower, 60; gross weight, 1,270 lb.; useful load, 342 lb.; maximum speed, 140 m.p.h. and range, 400 miles.

Officers of the company are: J. Claude Ryan, president; Earl D. Pindley, vice president; Robert C. Ryan, sales manager and treasurer; W. C. Smith, secretary; Lawrence H. Smith, chief engineer; R. C. Ryan, chief engineer.

**SECURITY NATIONAL 51-A**

Security National Aircraft Corporation  
Los Angeles, Cal.

WHEN W. H. Kinner, of the California State Department of Aeronautics and aviation, decided to encourage the production of airplanes for private use, the Security National 51-A, a two-place sporter with a Security 55-hp engine—was 120 hp. (rated). The Security 51-A is a low-wing, open plane selling for \$1,650 and is available with landing gear or on Skis. Standard equipment includes: Pitcairn altimeter, vacuum indicator, compass, tachometer, oil pressure gage, oil temperature gage, Smith master and primary fuel gage. The Ryan fuel tank is included.

General specifications are: number of seats, 2; horsepower, 115; gross weight, 1,775 lb.; useful load, 420 lb.; maximum speed, 120 m.p.h. at sea level; fuel range, 300 miles.

Officers of the Security National Aircraft Corporation are: W. H. Kinner, president; W. H. Kinner, Jr., vice president; Hugh H. Green, treasurer and sales manager; H. Paul Smith, secretary; and Max E. Porterfield, chief engineer.



For data specifications refer to page 96

For data specifications refer to page 96



**STINSON MODEL A**

Stinson Aircraft Company  
Waco, Tex.

THE ONLY modern motor transport in airline service at the present time is the Stinson A, powered with three Lycoming engines. The Model A has a steel tube fuselage and wing structure with spars built up of welded channel webbed steel tubing and ribs of riveted steel sheet tubing. Fabric covering is used for both wing and fuselage. Landing gear is retractable by electric power. Trailing edge flap extends across the entire section between mainfin and ailerons and about the full length of the wing panel.

General specifications are: number of seats 16; horsepower, 250; gross weight 3,000 lb.; useful load, 1,000 lb.; maximum speed, 180 m.p.h.; range, 640 miles.

Officers of the company are: B. D. DeForest, president; W. A. Jaffe, vice-president; D. E. Drake, treasurer; R. J. Frank, secretary; J. C. Kelly, Jr., sales manager; R. W. Ayer (President), chief engineer; C. R. Jones (Sales), chief engineer; A. M. Hall, factory superintendent and service manager.

**TAYLOR CUB**

Taylor Aircraft Company  
Brendon, Pa.

THREE TIMES as many Taylor Cubs were sold in 1935 as in the previous year and the company has set about to improve a number of design details in the 1936 model. Although the basic design remains unchanged, the suggestions of over a hundred customers of Cubs were considered by the engineering department and the result has been a much cleaner engine where aerodynamic efficiency is reflected in improved performance. Landing gear track has been increased to 72 in., due to a result of the suggestions of Cub operators and pilots. The new model is also suitable with motor engines.

General specifications of the new Taylor Cub are: number of seats, 2; horsepower, 27; gross weight, 150 lb.; useful load, 40 lb.; maximum speed, 42 m.p.h.; range, 210 miles.

Officers of the Taylor Aircraft Company are: T. F. Wolfe, president and chief manager; Walter Janssens, vice-president and chief engineer; W. F. Piper, treasurer; William F. Piper, secretary.

**WACO C-5**

Waco Aircraft Company  
Waco, Tex.

WACO AIRPLACES for 1936 are available in four series of models, two open and two closed. The larger of the series ships are those of the C-5 series which are available in two power plant variations—Continental-Jaco and two Wagners ranging in price from \$9,250 to \$9,500. Standard characteristics and overall dimensions for these five models are identical. All were equipped originally with Avia-Fin wheels and brakes and Goodyear tail wheels. Mustang drive shaft of 122 in. is made in each model. Plans are under way to locate these ships for engine fuel equipment.

Ships of this new series have larger fuselages, giving greater leg room, an improved instrument board, and flap to replace the older rudder strut.

General specifications are: number of seats, 3; horsepower, 225 to 300; gross weight, 3,100 to 3,500 lb.; useful load, 1,200 to 1,400 lb.; maximum speed, 150 to 172 m.p.h. and range, 550 to 650 miles.

80 percent of the company will be found on page 39, column 1.

**WACO 3-6**

Waco Aircraft Company  
Waco, Tex.

LOWER in power and in price than the C-5 series, all cabin planes is the closed 3-6 model powered with the Jacobs 3-4 engine. Like many Jacobs engines the 3-4 is available with either magnetic or battery ignition. Automobile producers have been followed closely in engine control installation and service appointments. The 3-6 model is similar in construction to the higher priced cabin ship, but has slightly smaller overall dimensions. The price is under \$5,000.

Fuselage is of the usual welded steel tube construction, wings are of wood and both are covered with fabric. Like the C-5 models it has a baggage compartment of 125 lb. Landing gear equipment is similar to that of the C-5 series using Avia-Fin wheels and brakes and a Goodyear tail wheel. The Model 3-6 is also available in fabric finish.

General specifications are: number of seats, 3; horsepower, 350; gross weight, 3,200 lb.; useful load, 1,300 lb.; maximum speed, 146 m.p.h.; range, 450 miles.

**WACO D-6**

Waco Aircraft Company  
Waco, Tex.

A CORNER between having higher power and performance than the members of the D-4 series is also available in the Waco line. This ship, one of the members of the D-6 series, is powered with a Pratt & Whitney engine of 400 hp. and is slightly larger in overall dimensions than the F-6 models. The D-6TD is a tandem two-seater with retractable landing gear, although it is structurally similar to all of the Waco machines it differs considerably from standard Waco design.

The top wing consists of two main parts joined at a station above the fuselage. Pilot and passenger sit further aft and the entire structure runs up to the rear of a "cove" which shelter and the entire fuselage is carefully faired for aerodynamic efficiency. There has been a considerable demand for this model in the export market. A military version is also available.

General specifications are: number of seats, 2; horsepower, 400; gross weight, 4,400 lb.; useful load, 1,300 lb.; maximum speed, 181 m.p.h.; range, 630 miles.

**WACO F-6**

Waco Aircraft Company  
Waco, Tex.

ALL WACO open models this year are equipped with motor engines. In the F-6 series the engines are desired in dimensions with line power plant variations—Continental, two Jacobs and a Wright.

Structurally the F-6 series (Mew model) Waco provides very standard fuselage, wing wings and landing gear. Landing gear equipped in all the open models is that of the cabin models—Avia-Fin wheels and brakes and Goodyear tail wheels. A 70 lb. baggage allowance is standard for all models of this series. Two of the open models, the Continental and Jacobs L-4 are to be available with flaps.

General specifications are: number of seats, 2; horsepower, 225 to 300; gross weight, 3,000 lb.; useful load, 1,200 to 1,400 lb.; maximum speed, 146 to 172 m.p.h.; range, 450 to 570 miles.

Officers of the Waco Company are: Clayton L. Bruckner, president; Lee R. Bruckner, vice-president and treasurer; L. E. St. John, secretary; Hugh R. Perry, sales manager; and A. Francis Ayer, chief engineer.



See also specifications on page 38

See also specifications on page 38

**FLYABOUT D-1, D-2**

Albion Aircraft, Inc.  
Albion, Michigan, Mich.

A DESCENDANT of the old-time Alexander Aircraft Corporation, Albion Aircraft, Inc., has been building Flyabout models for several years. Two models are offered—one the D-1 with Continental A-40 engine and the other the D-2 with Salsbury power plant.

Specifications for the Model D-2 are: Number of seats, 2; horsepower, 37; gross weight, 162 lb.; useful load, 300 lb.; maximum speed, 80 mph.; range, 150 miles.

Officers of the company are: P. W. Nichols, president and general manager; W. F. Tarkenton, vice-president and sales manager; P. A. Chivers, secretary, treasurer.

**ARROW MODEL F**

Arrow Aircraft & Airplane Corporation  
Lima, Pa.

MOST experienced of the designers in the Department of Commercial light plane construction was the Arrow Model F, a two-place low-wing monoplane with 52 hp. Arrow engine—a converted Ford V-8 developing 60 rated output at 2,000 r.p.m.

General specifications of the Arrow are: Number of seats, 2; horsepower, 52; gross weight, 1,600 lb.; useful load, 350 lb.; maximum speed, 110 mph.

Officers of the company are: Mark Wink, president; George Woods, first vice-president; F. Paul Woods, second vice-president; John Adick, secretary-treasurer; L. S. Mott, general and sales manager; Clark Remington, chief engineer.

**BROWN B-3**

Aviation W. Brown Aircraft Company  
Los Angeles, Cal.

NATIONAL air race winner never fails to attract the attention and faith of Lawrence W. Brown's production. Last year's Miss Los Angeles with Mustang power is illustrated above. A custom-built two-seater (the Brown B-3) is also offered.

Specifications for the Model B-3 are: Number of seats, 2; horsepower, 50; gross weight, 2,500 lb.; useful load, 800 lb.; maximum speed, 200 mph.; range, 400 miles.

Officers of the company are: Lawrence W. Brown, president; C. Fred S. McElroy, vice-president and sales manager; P. A. Brown, treasurer; P. F. Peters, secretary; Donald K. Nalburg, chief engineer.

**CUNNINGHAM HALL**

Cunningham Hall Aircraft Corporation  
Boulder, Colo.

EVER since the Cunningham side aircraft corporation of 1929, Boulder and The Hall have been working on the development of the high-altitude wing that they introduced at that time.

This device in a small radial form has been incorporated in a modern low-wing monoplane called the C-4 (210). The power plant is a Warner Super Scarab. (For detailed description of the C-4, see Aviation for January, 1935.)

General specifications are: Number of seats, 2; horsepower, 145; gross weight, 2,000 lb.; useful load, 700 lb.; maximum speed, 152 mph.; range, 300 miles.

**FAHLIN FLYMACOUPÉ**

Fahlin Aircraft Company  
Minneapolis, Minn.

AS PART of the Air Commerce Bureau's engine development program, the Fahlin Flymacoupe was designed around the converted Flymac automobile engine. The Flymacoupe is a modification of the Public Service radio monoplane for two which was introduced in the summer of 1934. The engine is the various plane was the British Flymac radial air cooled power plant.

Specifications of the Flymacoupe are: Number of seats, 2; horsepower, 40; gross weight, 1,000 lb.; useful load, 350 lb.; maximum speed, 135 mph.; range, 400 miles.

Officers of the Fahlin Company are: Ole Fahlin, president.

**GREAT LAKES 271A**

Great Lakes Aircraft Corporation  
Livonia, Mich.

ALTHOUGH no new changes have been made in the Great Lakes 271A, it is still available in the Class powered two-place, tandem, open fuselage model having in many private owners and school operators throughout the country.

General specifications are: Number of seats, 2; horsepower, 100; gross weight, 1,500 lb.; useful load, 500 lb.; maximum speed, 110 mph.; range, 270 miles.

Officers of the company are: Charles F. Dowd, president and general manager; P. E. Brown, vice-president and chief engineer; D. E. Brown, secretary and treasurer; C. A. Johnson, chief engineer.

**HAMMOND Y**

Hammond Aircraft Company  
Fairfield, Mass.

SPECIFICATIONS and construction details of the improved version of the Hammond Y have not yet been released and we are therefore obliged to limit this treatment to the rather type—a two-place low wing pusher with integral tail and three wheel landing gear. Power plant was the Mustang C-4 engine. Specifications include: Number of seats, 2; horsepower, 120; gross weight, 1,750 lb.; useful load, 300 lb.; maximum speed, 130 mph.

Officers of the Hammond Aircraft Company are: John E. Hammond, president and general manager; B. F. Hammond, vice-president and secretary; M. C. Mallon, chief engineer.

**MISTER MULLIGAN**

Howard Aircraft  
Chicago, Ill.

AIRIDE here is successful performance the most remarkable thing about Mr. Mulligan is its economy of design. It is a high wing monoplane of steel tube construction and fabric surfaces powered by a supercharged Pratt & Whitney Wasp with 150-hp. power and 450-hp. compression ratio. A product of the racing-developing team of Barney Harwood and Gordon Grant, Mr. Mulligan is the first step toward a high performance four place commercial airplane.

Specifications are: Number of seats, 4; horsepower, 200 at 11,000 ft.; gross weight, 4,519 lb.; useful load, 1,450 lb.; maximum speed, 131-201 mph.; range, 1,700 miles.

**LAIRD LC-EW450, E300**

L. H. Laird Aircraft Company  
Chicago, Ill.

TWO designs for high performance light aircraft are among the current offerings of the Laird Company. Both consist of a six-cylinder 2000 cc engine with a detachable supercharger and a detachable supercharger and a detachable supercharger. Specifications are: Number of seats, 2; horsepower, 400; gross weight, 2,200 lb.; useful load, 2,140 lb.; maximum speed, 200 mph.; range, 350 miles.

General specifications for the three place open cockpit machine are: Number of seats, 3; horsepower, 300; gross weight, 1,600 lb.; useful load, 1,800 lb.; maximum speed, 170 mph.; range, 300 miles.

Officers of the Laird Company are: L. H. Laird, president.

**AVIATE**

Aviatory Aircraft Corporation  
Cincinnati, Ohio

DESIGNED around a special installation of the Ford V-8 engine is the Aviatory Aviate, a two place low-wing monoplane of aluminum construction with integral tail. The engine develops 100 hp. at 2,800 r.p.m. and weighs 440 lb. complete including starter and generator. The engine is equipped with a system of liquid cooling.

General specifications are: Number of seats, 2; horsepower, 100; gross weight, 1,750 lb.; useful load, 350 lb.; maximum speed, 110 mph. and range, 300 miles.

Officers of the company are: M. E. McElroy, president and P. W. Smith, chief engineer.

**TRAINER**

Military Aircraft Corporation  
New York, N. Y.

A TWO-PLACE low-wing monoplane power is now being offered by the Military Aircraft Corporation. The airplane is designed to meet various conditions provided with Jacobs Warner or Warner engines. It is available for commercial use.

General specifications are: Number of seats, 2; horsepower, 120-200; gross weight, 2,023-2,018 lb.; useful load, 622-603 lb.; maximum speed, 138-130 mph.; range, 410 to 500 miles.

Officers of the company are: Donald Alexander, president; C. Alexander, vice-president (engineering); Lee Goldstein, vice-president (sales); Frank D. Zander, secretary; and J. Z. Kaplan, treasurer.

For data specifications refer to page 41

For data specifications refer to page 41

**PASPOD SKYLARK**

Paspo Aircraft Company  
Columbia, Cal.

A NEW Warner Research powered flying model called the Skylark has recently been constructed by the Paspo Aircraft Co. Paspo's Skylark has sole to suit testing accommodations for two passengers and is of ordinary wood and fabric construction.

General specifications are: Number of seats, 2; horsepower, 125; gross weight, 1,800 lb.; useful load, 450 lb.; maximum speed, 140 m.p.h. and range, 240 miles.

Officers of the company are: Paul Patterson, manager; Stanley Patterson, chief engineer; W. W. Walker and Edwin C. Kopp, designers.

**ROSE PARAKEET**

Rose Aircraft Corporation  
Chicago, Ill.

ANEWCOMB is the relatively small group of one-place airplanes in the Rose Parakeet Model A-1 with the Continental A-60 engine. The Parakeet has been designed for low cost cross country flying practice, where small operation and low maintenance are desirable. It is a highly of conventional design and construction.

General specifications are: Number of seats, 1; horsepower, 65 (255 p.h.); gross weight, 725 lb.; useful load, 177 lb.; maximum speed, 130 m.p.h. at 200 ft. and range, 240 miles.

Officers of the company are: J. H. Rose, president and general manager; C. E. Francis, secretary; M. W. Cunningham, treasurer.

**KITTHAWK B2**

Viking Flying Boat Company  
New Haven, Conn.

THE familiar Kitthawk Biplane continues to be available at a price cut of the Viking Flying Boat Co. of New Haven. A Kinner 85 engine is standard equipment. Specifications are: Number of seats, 2; horsepower, 125; gross weight, 1,700 lb.; useful load, 772 lb.; maximum speed, 110 m.p.h.; range, 420 miles.

Officers of the company are: Robert A. Gross, president; Frederick S. Gross, vice-president and treasurer; Robert Francis, secretary; R. T. Kirt and C. S. Gross, sales manager; Franklin T. Kirt, chief engineer and J. E. Kirt, assistant treasurer and general manager.

**WELCH, OWSM, OWTM**

One Welch Aviation School  
Andover, Ind.

TWO light plane models at present close to the \$1,000 mark are offered by the One Welch Aviation School. The Welch models are high wing and are of closed construction, powered with Continental A-40 or the Welch O-2 engines.

General specifications are: Number of seats, 2; horsepower, 30 to 45; gross weight, 950 lb.; useful load, 450-470 lb.; maximum speed 70 m.p.h. and range, 300 miles.

Officers of the company are: One Welch, president and chief engineer; Gene Welch, vice president; John Welch, secretary-treasurer; John Welch, sales manager.

**ARROWPLANE**

Wilde Aircraft  
San Jose, Calif.

FLOWN in its most testing grounds in the Marine Desert at Washington, D. C., the Wierman Arrowplane was accepted last summer for the Air Commerce Bureau as part of its development program. Most noted of the Department personnel, the Arrowplane has a three wheel landing gear and no tail. It is a rubber powered with the four cylinder Menasco engine. It is reported to have met all specifications set forth by the Department.

Specifications of the Arrowplane are: Number of seats, 2; horsepower, 30; gross weight, 1,300 lb.; useful load, 550 lb.; maximum speed, 110 m.p.h.; range, 250 miles.

**WILEY POST MODEL A**

Wiley Post Aircraft Corporation  
Baltimore, Md.

OF THE several conventional powered planes described in this directory, only one was available for private use a year ago. It was the Wiley Post Model A with the A-1, 1000 engine rated 40 hp at 1,900 r.p.m. The Model A is a two place open biplane of conventional construction priced at \$1,450 at factory. Specifications are: number of seats, 2; horsepower, 40; gross weight, 950 lb.; useful load, 411 lb.; maximum speed, 112 m.p.h.; range, 180 miles.

Officers of the company are: Ward Kivlen, vice-president; J. M. Kivlen, general manager and chief engineer; Thomas J. Eubank, secretary, treasurer and sales manager.

**ENGINES for 1936****Aeromarine Corporation of America** page 44, 45

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Arrow Aircraft & Motor Corporation** 49

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Aviation Folding Company** 55

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Barnett Aircraft, Ltd.** 44-45

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Continental Motors Corporation** 44-45

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Janet Aircraft Company** 45

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Janet Aircraft Company** 45-46

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Kinner Aircraft & Motor Corporation, Ltd.** 43-44

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**London Aircraft & Motor Corporation** 43-44

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**London Aircraft & Motor Corporation** 43-44

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Lycoming Inc.—Aviation Manufacturing Corp.** 56, 57

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Mancos Manufacturing Company** 47-48

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**National Airplane & Motor Company** 52

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Wiley Post Aircraft Company** 49

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Wright & Whittier Aircraft** 57-58

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Engine Control Systems, Inc.** 57-58

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Engine Engineering Corporation** 52-53

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Scoutair Engine Aircraft Corporation** 49

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Werner Aircraft Corporation** 49-50

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Wright Aircraft Motors** 49

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

**Wright Aircraft Corporation** 49-50

London Aircraft Company, Inc., President, Turkey Walter Van Pelt and Engineer E. F. Pelt. President Walter Van Pelt, Vice-President E. F. Pelt. Chief Engineer E. F. Pelt.

See also specifications table on page 42



**AEROMARINE AR SERIES**  
Aeromarine Aircraft  
Exeter, N. H.

THE series of the old Aeromarine Three B Motor Company line, have been taken over by Republic, and the two models AR 3 and AR 3-46, three-cylinder air-cooled engines, are being continued in production. Standard equipment on the AR 3 is dual ignition, either from a pair of Bosch magnets or from a dual battery system. On AR 3 46 single or dual magnets optional.



See also  
Aeromarine  
AR 3  
AR 3-46



**AERONCA**  
Aeronautical Engineering of America  
Chico, Ill.

THE Aeronca E-612 engine was developed in most the needs of this company for a simple and compact power plant for the two-place Aeronca monoplane. The latest model follows most aircraft engine practices with aluminum crankcase, forged steel cylinder barrels with hollow cast aluminum alloy heads. Crankshaft is of the over-piston type mounted on roller bearings.



**FAIRCHILD-PLYMOUTH**  
Fairchild Aircraft Company  
Kew-Forest, N. Y.

AS a part of the Bureau of Air Commerce light airplane development program, the Fairchild Company converted a standard 48 hp. Plymouth automobile engine for aircraft use. Prototype changes involve provision of a 5:1 reduction gear for propeller drive, installation of a Scaville Turbosupercharger, installation of an splash carburetor and a short neck exhaust manifold.



See also  
Fairchild-Plymouth  
48 hp  
48 hp



**JACOBS L-4 AND L-5**  
Jacobs Aircraft Engine Company  
Pittsburgh, Pa.

THE Jacobs Company has dropped production of all models of under 200 hp and has concentrated on two seven-cylinder models the L-4 and the L-5. Alternate layout of magnetic system is offered. Provision is made for combination of a hydraulic propeller pusher, tail rotor. In line with the increasing use of radio on presently-owned airplanes, stress building is stressed.

**CONTINENTAL A-40**  
Continental Motors Corporation  
Indianapolis, Ind.

WIDELY used in airplanes of the Tipler C-40 class is Continental's four-cylinder horizontal opposed engine, the model A-40. The compact power plant is built around a non-spark aluminum alloy crank case, four cylinders arranged in two banks of two each linked in the row. Ignition by one magnet (Bosch or Bosch), carburetor from a single barrel Siphonary.

**CONTINENTAL E-670**  
Continental Motors Corporation  
Indianapolis, Ind.

IN the modern horseshoe class Continental offers the seven-cylinder air-cooled radial model E-670 with a rating of 200 hp at 2100 rpm. An alternate model is available with a 5:1 compression ratio designed for 40 octane fuel. In the latter case the engine is rated at 175 hp at 2100 rpm. Starter, valve shrouds, fuel pump and propeller control valve are optional.

**KINNER 5-CYLINDER**  
Kinner Airplane & Motor Corporation  
Glendale, Cal.

KINNER five-cylinder engines include the K-5 (200 hp.), the K-6 (125 hp.), the K-7 (100 hp.), the K-8 (125 hp.). Details of all are essentially alike. Characteristics of these engines in the use of five separate carburetors one for each cylinder mounted in the crankcase and gear driven from the crankshaft. Crankshafts are all of the one-piece type with split connecting rods.

**KINNER 7-CYLINDER**  
Kinner Airplane & Motor Corporation  
Glendale, Cal.

THE 7 of the larger Kinner engines is typical with the C.P. of 300 hp. Most recently come the 5C-7, incorporating GE type supercharger and rated at 375 hp. Carburetors of the conventional radial type are used in the seven-cylinder engines instead of the individual carburetors of the five-cylinder series. A four-valve-cylinder two-row type was exhibited at the Los Angeles Show.



**LAMBERT R-266**

Lambert Aircraft Corporation  
Wichita, Kan.

**P**RESENT Lambert engine is a development of the M-V-8 five-cylinder engine which originally appeared in 1926 as the M-1. The current model R-266 shows, however, a great many improvements over its prototype Dual Scavella version and a single Scavella carburetor are standard equipment. Crankshaft is of the two-piece type with solid master rod.

**LE BLOND 180**

Edmond Abbott Engine Corporation  
Channahon, Ill.

**T**HE LeBlond 180 is similar in general arrangement to the B-10 and the B-11 but uses seven cylinders instead of five. Cylinder construction is different, however, being of the composite cast brass and aluminum head type. Crankshaft is of one piece and master connecting rods are of the split type. As in the smaller engines, a single valve actuates both the intake and the exhaust.

**ENGINES**

The size  
model and  
year  
page 46

**LE BLOND 10 AND 85**

Edmond Abbott Engine Corporation  
Channahon, Ill.

**F**IVE-CYLINDER LeBlond engines are put up in two sizes, the 79 and the 85. The chief difference between the two engines is in the bore and displacement. Cylinders are one-piece construction of cast iron. Crankshaft has six pins with split master rod bearings. Crankcase is an aluminum alloy casting with intake camshaft cast integral.

**LYCOMING R-680**

Lycoming Manufacturing Corporation  
(Lycoming Division) Williamsport, Pa.

**T**HE model R-680 Lycoming is widely used in many training aircraft and also in standard equipment on the one, two and three-seater and General airplanes. It is essentially a transport type engine. It is produced in four distinct models, the R-680-2 (240 hp.), the R-680-3 (240 hp.), the R-680-4 (240 hp.) and the R-680-4 (325 hp.).

**MENASCO PIRATE**

Menasco Manufacturing Company  
Los Angeles, Cal.

**M**ENASCO pioneered in the development of the six-cylinder engine in the United States. The four-cylinder line (Pirate series) includes the B-4 (75 hp.), the C-4 (105 hp.) and the C-4S (130 hp.). The latter model is similar in design to the first two, but is supercharged. It has had wide use in racing and other special purpose airplanes during the last few years.

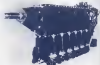
**PRATT & WHITNEY WASP JR.**

Pratt & Whitney Aircraft Division  
Windsor, Conn.

**S**MALLEST of the Pratt & Whitney family is the Model SR Wasp Jr. It appears in one model only with a cruising rating of 200 hp. at 5,000 ft. and a take-off rating of 430 hp. For maximum operation it is rated at 480 hp. It embodies all the standard features of the larger Wasp and Hornet engines, except automatic valve gear hydraulic automatic mixture control.

**ENGINES**

The size  
model and  
year  
page 47

**MENASCO BUCCANEER**

Menasco Manufacturing Company  
Los Angeles, Cal.

**M**ENASCO six-cylinder in-line inverted engine is available in the B-6 (180 hp.) and the D-6S (200 hp.), a supercharged model. Latest model is a "Super-Buccaneer" the Model C-6S-4 rated at 250 hp. at 2,000 r.p.m. at 5,000 ft. This engine is very similar to the B-4S except that cylinders and pistons are interchangeable with the C-4 and C-4S Pirates.

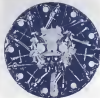
**PRATT & WHITNEY TWIN WASP JR.**

Pratt & Whitney Aircraft Division  
Windsor, Conn.

**A**LTHOUGH a great deal of development work is going forward on twin row engines, most of it is on experimental status and few details can be reported. The only engine of the Twin Wasp Jr. series that has been released for commercial use is the 5A-1-G illustrated here. It is put up in a ground and supercharged form only.





**PRATT & WHITNEY WASP**

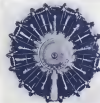
Pratt & Whitney Aircraft Division  
Hammonds, Conn.

**STANDARD** power plant for many an engine for the last five years has been the Wasp in one of its several forms. The long-lambert C-1 Wasp has now been replaced by the L-14 in current production. The latest in the S series which in its several forms has been running at 550 hp with maximum available for take-off up to 600 hp.

**PRATT & WHITNEY HORNET**

Pratt & Whitney Aircraft Division  
Hammonds, Conn.

**UNTIL** the advent of the highly supercharged and the new new Wasp, the Hornet series represented the most powerful of the Pratt & Whitney products. Seven models of this well known engine are now available commercially, all designed in the accompanying span. Broken tables (page 50). Current and proved forms are available. All engines are structurally similar.

**PRATT & WHITNEY TWIN WASP**

Pratt & Whitney Aircraft Division  
Hammonds, Conn.

**THE** same conditions of service required by the Navy that apply to the Twin Wasp Jr. series apply also to the latest of the four-cylinder class, the L-140 twin Wasp. The Model 5144 G is characterized and specified in the accompanying tables. The only commercial application of these engines so far has been in the three Martin 125 flying boats.

**RANGER—SIX**

Ranger Engineering Corporation  
Pittsburgh, Pa.

**WITHIN** the past year Fairchild has come back into the engine market with two new series of Ranger engines of which the 6-300 D is the latest. As reported the six-cylinder models are available with direct drive and without supercharging. Characteristic is the overhead cam shaft, hand gear driven from the output end of the engine.

**RANGER—TWELVE**

Ranger Engineering Corporation  
Pittsburgh, Pa.

**THE** V-series inverted twelve-cylinder Ranger engines have most of their parts interchangeable with the six-cylinder series. These variations are available a direct drive unsupercharged and direct drive supercharged, and a general and supercharged model. Detailed details of all models are under. For details of the variation see the specification tables.

**WARNER SCARAB**

Warner Aircraft Company  
Detroit, Mich.

**THE** new-cylinder Warner engines appear in two forms the Scarab at 125 hp rating and the Super-Scarab at 140 hp. Both engines are identical except that the Super has a greater displacement and a slightly higher compression ratio. Castalloy is of the crank-pin type with split bearing and fitted. Cylinders are composite cast head and aluminum head.

**WARNER SCARAB JR.**

Warner Aircraft Company  
Detroit, Mich.

**THE** Scarab Jr. series is basically the same as the Scarab engine (Warner Scarab) except that it is set up with five cylinders instead of seven, which brings the horsepower down to 80. Many of the parts are interchangeable with the larger engine. Lightness is from two forward, downward, and backward from a single fully carburetor.

**WEICHT WHIRLWIND—T**

Weicht Aeromarine Corporation  
Pittsburgh, Pa.

**FOUR** variations of the well known seven-cylinder Whirlwind series are now available ranging in power from 225 hp to 300 hp. These engines all have the same basic dimensions and displacement (750 cu in.) with the variation and output caused by varying degrees of supercharging and changes in compression ratio.



**WRIGHT WHIRLWIND E-75**

Wright Aeromarine Corporation  
Paterson, N. J.

**T**HE four-cylinder Whirlwind series breaks into a higher power class, the three models ranging from 220 hp. to 420 hp. at sea level. These engines are similar in detail to the two-cylinder series. They carry the basic conventional operating design, automatic valve gear lubrication and full pressure cooling. All models are supercharged.

ENGINES

**WRIGHT 14-CYLINDER WHIRLWIND**

Wright Aeromarine Corporation  
Paterson, N. J.

**E**IGHT models of two Whirlwinds are now available. Depending on degree of supercharging and compression ratio, power ranges from 320 to 700 hp. These engines are available in both power and direct drive. The details of the several models appear in the specifications table. All models are basically similar in structural detail.

**WRIGHT CYCLONE**

Wright Aeromarine Corporation  
Paterson, N. J.

**M**OST popular engine on Wright list is the Cyclone which powers a high percentage of military and commercial aircraft in the United States. It is available in twenty-two different models, including power and direct drives in power ranging from 500 to 700 hp. Nine models under development but not available commercially are understood to be approaching 1,000 hp.

**WRIGHT CONQUEROR**

Wright Aeromarine Corporation  
Paterson, N. J.

**O**NLY liquid cooled engine (except automobile non-revving) commercially available as the Wright Conqueror with twelve cylinders in a V six arrangement. Two versions are offered both supercharged, both power, differing primarily in compression ratio. Cylinders are in two blocks of six each. Good speed and maneuverability.

**ACCESSORIES for 1936****AIRCRAFT ACCESSORIES****Belmont**

C. F. BELMONT LUMBERMILL, INC.,  
371 West Monroe Street, Chicago  
FAYETTE ROSSMAN BATTERY COMPANY  
Philadelphia, Pa.  
GEORGIA STORAGE BATTERY COMPANY  
TUCKER, DEKOR, N. Y.  
FRIEDLANDER ROSSMAN BATTERY  
COMPANY Philadelphia, Pa.  
ROSSMAN BATTERIES, INC., Reading,  
Pa.  
W. ELGAR ROSSMAN BATTERY COMPANY,  
224 East 124th Street, Cleveland.

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Thompson Street, Philadelphia, Pa.  
BELL & HOWELL COMPANY, 100  
Lafayette Avenue, Chicago 18  
EASTMAN KODAK COMPANY (Bak),  
Baltimore, N. Y.  
GRANTIN DYNASTIC EASTMAN KODAK  
COMPANY Rochester, N. Y.  
FARMER'S ARTS & CAMERA COMPANY  
New Windsor, L. I. N. Y.  
KODAK SAFETY COMPANY, Municipal  
Airport, Cleveland, Ohio

**Consolid**

ALCO BATTERY, 1115 West Main  
Street, Chicago 21  
BATTERY MANUFACTURING COMPANY,  
Long Island City, N. Y.  
LOWERY - BATTERY MANUFACTURING  
COMPANY, Alton, Wash.  
BATTERY MANUFACTURING COMPANY,  
Kalamazoo, Mich.

**Electrical Equipment**

ELCO BATTERY, 1115 West Main  
Street, Chicago 21  
CANNON ELECTRIC DEVELOPMENT,  
West Avenue 34, Los Angeles, Cal.  
ELECTRIC AVIATION CORPORATION, East  
Orange, N. J.

GENERAL ELECTRIC COMPANY, Schenectady, N. Y.  
HUGHES & LUBBER, Ltd., South Sea  
Islands, Cal.  
HARRY HUBBARD & COMPANY, Inc.,  
Bridgport, Conn.  
LUBBERING LUBBERING, 428 E. 10th  
Avenue, Chicago, Ill.  
PACIFIC ELECTRIC COMPANY, Inc.,  
215 Lexington Avenue, Brooklyn,  
N. Y.  
WESTINGHOUSE ELECTRIC & MANUFACTURING  
COMPANY, East Pittsburgh, Pa.

**New Developments**

PRINCE MANUFACTURING COMPANY,  
30 Hudson Avenue, Newark, N. J.  
WALTER EDGEMORE & COMPANY, Inc., 110  
Cedar Street, New York City  
PRINCE MANUFACTURING COMPANY,  
90 1st Broadway, Cincinnati, Ohio

**Reas**

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Street, Long Island City, N. Y.  
REASONS REASONS, 1115 West Main  
Street, Long Island City, N. Y.

**Reas**

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BATTERY MANUFACTURING COMPANY,  
Long Island City, N. Y.  
LOWERY - BATTERY MANUFACTURING  
COMPANY, Alton, Wash.  
BATTERY MANUFACTURING COMPANY,  
Kalamazoo, Mich.

**Reas**

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LOWERY - BATTERY MANUFACTURING  
COMPANY, Alton, Wash.  
BATTERY MANUFACTURING COMPANY,  
Kalamazoo, Mich.

ELCO NATIONAL MANUFACTURING  
COMPANY, Newark, N. J.  
JAMES WATSON COMPANY, 304 East  
10th Street, New York  
KODAK SAFETY COMPANY, 1  
James Street, Brooklyn, N. Y.  
LEWIS & BROTHERS COMPANY, 404  
Market Street, Philadelphia, Pa.  
TALL LAMAR ENGINEERING COMPANY,  
Naples, Conn.  
LUBBERING LUBBERING, Long  
Island City, N. Y.  
MANN MANN GEAR & ENGINEERING  
COMPANY, La Crosse, Wis.  
NEW BATTERY COMPANY, New  
Haven, Conn.

PACIFIC ELECTRIC COMPANY, 215  
Lexington Avenue, New York  
PRINCE MANUFACTURING COMPANY, Inc.,  
70 Lexington Avenue, New York  
N. Y.

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REASONS REASONS, 1115 West Main  
Street, Long Island City, N. Y.

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Street, Chicago 21  
BATTERY MANUFACTURING COMPANY,  
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LOWERY - BATTERY MANUFACTURING  
COMPANY, Alton, Wash.

BATTERY MANUFACTURING COMPANY,  
Kalamazoo, Mich.

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Orange, N. J.

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PELCO, Olato Company, Lexington, Pa.  
 DENCO Air Center Company, Inc., 107 Jefferson Avenue, Bellingham, N.Y.  
 SMOKE PARABOLIC & EQUIPMENT COMPANY, South Road and Ivy Street, Tinton, N.J.  
 TROUBLE FANLIGHT COMPANY, 622 Cambridge Avenue, Greenwich, Conn.

**Propulsion**

AMERICAN PROPELLER COMPANY, South Road, N.Y.  
 CALIFORNIA PROPELLER COMPANY, C.R. West Station Avenue, Los Angeles, Cal.  
 COMBIE AIRCRAFT & MOTOR COMPANY, Buffalo, N.Y.  
 FLETCHER PROPELLER COMPANY, 1000 Air Avenue, Grand Rapids, Mich.  
 HARRIS PROPELLER COMPANY, Clark Avenue, Forest Park, Ill.  
 HAWKLEY SQUARES PROPELLER DIVISION, DUTCH AIRCRAFT MANUFACTURING CORPORATION, East Hartford, Conn.  
 HAWKLEY PROPELLER COMPANY, Division of HAWKLEY INDUSTRIES, Inc., Piquette, Ohio.  
 LYNCHBURG SOUTH MANUFACTURING COMPANY, Wilmington, Pa.  
 MARSHALL-PALMER PROPELLER COMPANY, Maryland, Md.  
 PETERSON SCREW & BOLT COMPANY, Pittsburgh, Pa.  
 SCHNEIDER ENGINE LUMPS, P.O. Box, Amesbury Company, White, Kan.  
 STOFF, GUSTAV COMPANY, 500 Perryville Road, Glendale, Cal.  
 SUPREME PROPELLER, Memphis, Tenn.

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ABSTRACTS TOOL COMPANY, Research Park, Monaca, N.Y.  
 AIRCRAFT BOLT CONNECTION, Broomfield, N.Y.  
 BRUCE CONNECTION, Norfolk, N.J.  
 THE BUSH DEVELOPMENT COMPANY, 202 East 40th Street, Cleveland.  
 CANTON ELECTRIC CONNECTIONS, West Avenue 10, Los Angeles, Cal.  
 FARMER AVIATION CONNECTIONS, Woodland, L.A., W. Va.  
 HARTY RATIO LUBRICATORS, 101 Bayview Street, Boston, Mass.  
 HAYES & KAYMAN, Inc., North Sea, Pennsylvania, Cal.  
 LEAS DEVELOPMENTS, Inc., 125 West 17th Street, New York City.  
 MACHINISTS CONNECTION of AMERICA, 60 Broad Street, New York.  
 RAMP MANUFACTURING CONNECTION, 22 East 40th Street, New York.  
 RCA MANUFACTURING COMPANY, Inc., Camden, N.J.  
 SCARPER & SONS, Inc., Boone N.Y.  
 TROOP BARS MANUFACTURING CO., P.O. Box 128, Amherst Avenue, Chicago, Ill.  
 WEISSBACH ELECTRIC & MANUFACTURING COMPANY, East Pittsburgh, Pa.  
 WYNNER ELECTRIC COMPANY, Inc., 100 Broadway, New York City.

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AMERICAN PAINT & BLANK COMPANY, Five and Withwood Street, Jackson, Miss.  
 DENCO PRODUCTS CORPORATION, South Road, N.Y.  
 THE CARROLLS FLETCHER TOOL COMPANY, 234 East 7th Street, Cleveland, Ohio.  
 INDUSTRIAL ENGINEERING & MANUFACTURING COMPANY, 230 John Street, Burlington, Conn.  
 KUNDEL MANUFACTURING COMPANY, 1000 Broadway, New York City.  
 THE MARSH AIRCRAFT CONNECTION, 2020 Harvey Avenue, Detroit.

**Tools**

FORNOSTONE TOOL & BLANK COMPANY, Akron, Ohio.  
 GENERAL TOOL & SUPPLY COMPANY, Akron, Ohio.  
 TAYLOR & P. GEORGE COMPANY, Akron, Ohio.  
 THE GEORGE TOOL & SUPPLY COMPANY, Akron, Ohio.

**Wholesale and Retail**

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 AIR TRANSPORT EQUIPMENT, Inc., Thompson Field, Garden City, N.Y.  
 BROWN PROPELLER CONNECTION, South Road, N.Y.  
 DAYTON WIRE WHEEL COMPANY, Miami Beach, Fla.  
 SCHNEIDER ENGINE LUMPS, P.O. Box, Amesbury Company, White, Kan.  
 STOFF, GUSTAV COMPANY, 500 Perryville Road, Glendale, Cal.  
 SUPREME PROPELLER, Memphis, Tenn.

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AIR CENTER (Broomfield, N.Y.), C.R. West, N.Y.  
 AIRCRAFT BOLT CONNECTION & COMPANY (Broomfield, N.Y.), 100 N. 1st Street, Broomfield, N.Y.  
 AIRCRAFT BOLT CONNECTION, Broomfield, N.Y.  
 AIRCRAFT BOLT CONNECTION, Broomfield, N.Y.  
 AIRCRAFT BOLT CONNECTION, Broomfield, N.Y.  
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 AIRCRAFT BOLT CONNECTION, Broomfield, N.Y.

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AIRER COMPANY, Cleveland, Ohio.  
 BLANK COMPANY, 622 Perryville Road, Pittsburgh, Pa.

RESEARCHING-STADY CORPORATION, 1000 Broadway, New York City.  
 MARYLAND NATIONAL BUSINESS COMPANY, Baltimore, Md.  
 J. H. BROWNE COMPANY, Great Building, Pittsburgh, Pa.  
 TROUBLE FANLIGHT COMPANY, 622 Cambridge Avenue, Greenwich, Conn.

**Aviation**

AMERICAN FINE PAINT COMPANY, East Avenue, Baltimore, Md.  
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 BUSH DEVELOPMENTS, Inc., 125 West 17th Street, New York City.  
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 THE MARSH AIRCRAFT CONNECTION, 2020 Harvey Avenue, Detroit.

**Aviation**

AMERICAN FINE PAINT COMPANY, East Avenue, Baltimore, Md.



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You are assured positive lubrication on cold take-offs . . . and all the time your ship is flying in high altitudes or in extremes of weather.

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your engine*

Engines that falter, that worry the

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But you can forget all that when you order Texaco. You run no risk from hard flinty carbon . . . or sludge . . . or gummed-up piston rings.

Texaco Aviation Products are specially refined for our own Aviation Division. Look for the trademark at all important airports.

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# TEXACO

# Aviation Products

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DELT FURNACE COMPANY, Balaire, L. I., N. Y.

ELIANT SPOT NUT CORPORATION, Elizabeth, N. J.

HARRIS MACHINERY SUPPLY COMPANY, 425 Capital Avenue, Stamford, Conn.  
JACOBI & JACOBI ENGINEERING COMPANY, 228 John Street, Bridgeport, Conn.  
KROGER STEELWORKS & SUPPLY COMPANY, 1860 West Adams Street, Chicago, Ill.

MALLEN KEYS & MACHINERY COMPANY, Millard, Conn.

THE PALLET COMPANY, Inc., 38 Corbett Street, Irvington, N. Y.

PACIFIC KALAM CORPORATION, 280 Varick Street, New York City

STANDARD TOOL WORKS COMPANY, Chicago, Ill.

SWISS-CASE FURNACE CORPORATION, 11 Allen Street, Cambridge, Mass.

THE WINDSOR WARRIOR MARINE TOOL COMPANY, Milwaukee, Wis.

**Holdings and Holdings**

TECHNICAL BRASS MANUFACTURING COMPANY, 521 South Bacon Avenue, Chicago, Ill.

UNION-BRASS COMPANY, Cincinnati, Ohio

THE FARMER AERIALS COMPANY, 1125 Euclid Avenue, Cleveland

STANDARD WAREHOUSE CORPORATION, 1801 Danvers, Chicago, Ill.

**Imports**

ALLEN DODGE IMPORT COMPANY, Leominster, Mass.

BULLER & SPENCER, Hartford, Conn.

CARTER DODGE IMPORT & MANUFACTURING COMPANY, Canton, Mass.

CONQUEST IMPORT & MANUFACTURING COMPANY, Easton, N. Y.

FRANK BERNHARDT COMPANY, Aurora, Ill.

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

GORDON HENRY COMPANY, Detroit

PARK DODGE IMPORT COMPANY, 121 East Broadway, New York, Cleveland

DAVID DODGE & SONS COMPANY, New York, N. Y.

UNITED STATES & SONS COMPANY, New York, N. Y.

THE WILLIAMS & COMPANY, 75 Spring Street, New York City

WYMAN-DAVIS COMPANY, Worcester, Mass.

**Costs**

DETROIT BARBER & MANUFACTURING COMPANY, 1215 Park Milwaukee Avenue, Detroit

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

THE GILBERT PACKING COMPANY, Paterson, N. Y.

GORDON HENRY & PACKING COMPANY, Inc., New Brunswick, N. J.

ROBERTSON DODGE & SON, Torrington, Conn.

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

THE FIVESTAR MANUFACTURING COMPANY, Torrington, Conn.

**Stocks/Work**

GEORGE FARMER COMPANY, Philadelphia, N. Y.  
1100 MANUFACTURING COMPANY, Erie, Pa.

**Trains**

THE MILWAUKEE RAILROAD COMPANY, Milwaukee, Wis.

RAVENS MANUFACTURING COMPANY, Erie, Pa.

AMERICAN LIVING COMPANY, 20 Main Street, Brooklyn, N. Y.

**Tu Rels**

DODGE MANUFACTURING, Inc., 24 South Street, Newark, N. J.

SEVEN HARTFORD COMPANY, 330 Fifth Avenue, New York City

MACFARLANE COMPANY, Toronto, Wis.

**Taking (Held)**

AMERICAN METAL WORKS COMPANY, American Brass Company, Milwaukee, Wis.

BRASS CORPORATION, Inc., 24 South Street, Newark, N. J.

CHRYSLER CORP. & BRASS COMPANY, 24 South Street, Newark, N. J.

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**SHIP EQUIPMENT**

AMERICAN BRASS COMPANY, 410 South Street, Newark, N. J.

CHRYSLER CORP. & BRASS COMPANY, 24 South Street, Newark, N. J.

BRASS CORPORATION, Inc., 24 South Street, Newark, N. J.

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THE DODGE MANUFACTURING COMPANY (air equipment), New York, N. Y.

CHRYSLER FURNACE TOOL COMPANY, 5 East 4th Street, New York City

DE VRIES COMPANY (air equipment), Toledo, Ohio

KROGER & BENDIS COMPANY (air equipment), Washington, D. C.

WORLD MACHINE COMPANY (air equipment), Worcester, Mass.

HARRIS VANCE MANUFACTURING COMPANY (air equipment), P. O. Box 11, Cleveland, Pa.

IMPERIAL PNEUMATIC TOOL COMPANY (air equipment), 400 West Jackson Boulevard, Chicago

LEWIS AIR PNEUMATIC COMPANY (air equipment), 265 East 42d Street, New York City

THE ALUMINUM MODERN COMPANY (air equipment), 3115 West Robinson Street, Baltimore, Md.

DAVIDSON AIR BRIDGE COMPANY (air equipment), Chicago, Ill.

A. SCHMIDT'S SON, Inc. (air equipment or equipment), Newark, N. J.

STOLLER INC. (air equipment), 348 Erie Avenue, Chicago, Ill.

SOUTH WILSON EQUIPMENT COMPANY, 343 South River Street, Milwaukee, Wis.

THE STANLEY WORKS (air equipment), Lake Street, New York, N. Y.

THE STANLEY CYCLOPNE, Akron, Mass.

UNION CYCLOPNE & CYCLOPNE COMPANY (air equipment), 38 East 42d Street, New York City

UNION CYCLOPNE, Inc., 38 East 42d Street, New York City

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**MISCELLANEOUS**

AMERICAN OPTICAL COMPANY (air equipment), Southfield, Mich.

J. V. W. COMPANY (air equipment), 100 Broad Street, Newark, N. J.

E. B. MERVINSON INC. (air equipment), 530 Fifth Avenue, New York City

WRIGHT CYCLOPNE & CYCLOPNE COMPANY, 38 East 42d Street, New York City

**DISTRIBUTORS**

AMERICAN BRASS COMPANY, 410 South Street, Newark, N. J.

CHRYSLER CORP. & BRASS COMPANY, 24 South Street, Newark, N. J.

BRASS CORPORATION, Inc., 24 South Street, Newark, N. J.

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# The new D-5T powered by WRIGHT CYCLONES

Wright Cyclones have been selected to power American Airlines' fleet of giant, new Douglas Sleeper Transports. This announcement is the most important commercial aircraft engine news since the decision, two years ago, to equip the first Douglas transports with Wright Cyclones.

The Cyclone-powered Douglas is now internationally famous. Today 150 giant airliners of the DC-7 type are in operation on landing routes in 21 countries throughout the world. They fly 75,000 miles daily—three times the circumference of the Earth at the Equator. And it is estimated that in class Cyclone-powered Douglas transports have flown the imposing total of 23,000,000 miles.

American Airlines' giant, new Douglas Sleeper Transports are equally equipped for night and day travel.

The spacious cabin provides large, private sleeping accommodations for 16, with day accommodations for 24—and furnishes all of the conveniences of a deluxe transcontinental train. American Airlines will soon place these luxurious transports in transcontinental service—providing direct overnight sleeper service from New York to California.

The new 2000 horsepower Wright Cyclones which have been selected to power the Douglas D-5T Transports are the same type as the engines which recently enabled Howard Hughes to establish a new transcontinental speed record in the phenomenal time of 9 hours and 25 minutes. The remarkably low fuel consumption of this engine supplements the low maintenance costs and reliability of the Wright Cyclone—established by 100,000,000 miles of airline operating experience.



## WRIGHT

AERONAUTICAL CORPORATION  
PATERSON NEW JERSEY

A DIVISION OF DORTCH-WRIGHT CORPORATION









laminae parts, also aluminum alloy and stainless steel forgings. Both aluminum alloy wing structures and steel forgings.

**President:** James W. Wick, president; **R. M. Speyer** and **R. D. Wick**, vice-presidents; **John R. Moss**, secretary and treasurer; **James Wick**, sales manager; **G. S. Simons**, chief engineer.

#### Buhl Strapping Company

ALUMINUM aluminum aircraft parts produced with precision and highest standards, are duct, corrosion resistant parts, steel and stainless steel parts.

**President:** A. D. Buhl, president; **H. S. Hildebrandt**, vice-president; **N. E. Ross**, secretary; **T. D. Buhl**, secretary; **T. M. Ross**, sales manager; **M. F. McCarty**, chief engineer.

#### C. F. Burgess Laboratories, Inc.

One of a wide range of products, the laboratory is of interest to the aeronautical industries. Items: a monomeric metal alloy, structural materials (metals) and treatment for strengthening metals, dry lubricants for radio use, insecticides and chemical devices for detection systems.

**President:** George Douglas, president; **E. S. Reynolds**, vice-president; **D. J. Lewis**, secretary and treasurer; **E. A. Day**, sales manager; **R. F. Voss**, chief engineer.

#### Circutair Transformer Company

Circutair's transformers and products find many uses in the transportation and communications of airports. Also a number of power units sold by this company are used in direct connected equipment used to supply current for radio signal, radio communications, etc.

#### Champion Spark Plug Company

Manufacturers both new and replacement spark plugs. Plus and radio spark plugs are available.

**President:** E. A. Thompson, president; **T. D. Thompson**, vice-president and secretary; **H. B. Shaw**, secretary; **E. M. Bradford**, sales manager; **O. C. Eakin**, chief engineer.

#### Chico Brass & Copper Company

THIS COMPANY manufactures many types of bearings, bushings and other accessories in brass suitable to a number of important applications. A subsidiary of **Aluminum Casting Corporation**.

#### Cleveland Pneumatic Tool Company

Successors in manufacture of shop equipment, also pump and straight pneumatic types of loading and dock units. Products line includes the Aerial and Great series available for aircraft and all weights from the lightest sizes up to the heaviest transport in military craft.

**President:** L. W. Grier, president; **M. Fisher**, vice-president; **J. D. Macey**, secretary; **A. Brown**, secretary; **P. M. Shaw**, sales manager; **J. P. Wilson**, chief engineer.

#### Climax Molybdenum Company

COMPANY manufactures alloys that many use in highly stressed parts in aircraft. This company handles one of the best alloys for the production of these members.

#### C-O-Two Fire Equipment Company

THIS COMPANY specializes in the manufacture of emergency and special vehicles double fire extinguishing systems for general plant protection. Storage and support systems are available.

**President:** R. E. Allen, president; **M. A. Leland**, vice-president; **E. A. Clegg**, secretary and treasurer.

#### Consolidated-Ashcroft-Hessock Company, Inc.

THE AMERICAN line of turbine instruments includes high speed engine test instruments of temperature of pressure and fuel pressure gauges, low air speed instruments (for jet engines), fuel type instruments, fuel pressure gauges.

**President:** R. E. Allen, president; **H. P. Bradley**, vice-president in charge of sales; **T. M. Cramer**, secretary and treasurer; **R. E. Kuehn**, sales manager; **Richard A. Brown**, E. W. Newman, chief engineer, instrument division.

#### Cresco-Hinds

SPECIALIZES in the lighting of large areas. This company offers all types of equipment for airport lighting.

#### The Case Engineering Corporation

COMPANY specializes in the design and construction of many aircraft systems and are adaptable as substitute equipment in many others. Plans to operate on the edge of the science and art.

self-designing without stopping the engine or shutting it off.

**President:** C. M. Cain, president; **H. A. Davidson**, secretary; **T. L. Brown**, sales manager; **E. L. Whelan**, chief engineer.

#### Curtiss Aeroplane & Motor Company, Inc.

Manufacturers primarily in aircraft manufacturing, this company offers the Curtiss practically operated completely the goods produced. These models available in dimensions up to 10 ft. in diameter to work up to 200 ft. in diameter and controlled by electric motor in the hub. Blade ball fastening.

**President:** G. S. Wright, vice-president; **J. A. D. Smith** and **T. P. Wright**, secretaries; **C. S. Lipp**, treasurer; **B. S. Green**, secretary; **J. A. Wright**, sales manager.

#### Cycloc Fence Company

COASTAL fencing (wire), gate and locking hardware are widely used for airport enclosures.

**President:** C. F. Fischer, president; **R. C. Martin**, vice-president; **W. F. Kridler**, treasurer; **A. F. Allen**, secretary; **R. E. Pranger**, sales manager; **J. P. McHenry**, general superintendent.

#### Dandlet Trucking Corporation

DELIVERIES SERVICES (both and air) with the Dandlet trucking service, are available for all types of aerial delivery.

**President:** A. F. Hylton, president; **H. W. Dene**, vice-president; **M. W. Fischer**, treasurer; **C. A. Galt**, secretary.

#### Eastman Kodak Company

Eastman's services particularly adaptable for aviation are in aerial photographic film.

**President:** W. F. Emery, president; **T. J. Hargrove**, C. F. Shaw, E. A. Jones, vice-presidents; **M. R. Feltus**, treasurer; **T. J. Hargrove**, secretary.

#### Eclipse Aviation Corporation

THIS CORPORATION of London Aviation Corporation, manufactures the following aircraft accessories: antenna systems, direct reading electric meters, hand timing charts, air direction devices, electric indicator devices, single-light systems, double-light systems, radio compasses, aerial radio compasses, air pump, alarm equipment, automatic variable pitch propeller.

# PRECISION BEARINGS



# FOR AIRCRAFT CONTROLS

A pioneer experience of a quarter century is reflected in the introduction of the PRECISION Aircraft Control Bearings pictured above. During the World War, and in the years since, NORMA-HOFFMANN PRECISION Bearings have been an important factor in aircraft construction, in many vital applications, in practically every military-making flight, NORMA-HOFFMANN Bearings have participated—in planes, engines, controls, instruments or accessories.

The first high grade ball bearing control pulleys were equipped with these NORMA-HOFFMANN PRECISION Bearings. And NORMA-HOFFMANN engineers, still pioneering, have developed many of the difficulties bearing types now accepted in aviation practice. Today almost every representative manufacturer of aircraft and equipment—including the U. S. Government—is a user of NORMA-HOFFMANN PRECISION Bearings.

The NORMA-HOFFMANN line of 100 different sizes includes standard control bearings—PRECISION Ball Roller and Thrust Bearings for practically every aviation requirement. Write for the Catalog and the booklet "Precision Bearings for Aircraft Controls." Let our engineers work with you.

# NORMA-HOFFMANN

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN., U. S. A.

PRECISION BALL, ROLLER, AND THRUST BEARINGS

for hub, clevis, motor for retractable landing gear, fuel distributors, engine speedometers, flexible flexible tubing, auxiliary profiles, engine power equipment, hydraulic remote control.

**Personnel:** Charles Stevens, president, R. P. Loring, vice-president, W. J. Butler, treasurer, M. A. Goulet, secretary, A. E. Kline, chief engineer, R. P. Loring, chief engineer.

#### Edo Aircraft Corporation

Edo has modern conversion equipment available for practically every type of airplane (military and military) in production. Edo designs is for new but installation. Edo is of all metal construction, carrying water tanks are standard equipment. Available in two models, for ships ranging in gross weight from 1,750 to 4,500 lb. Special plans for larger ships (Ford, Gruber, etc.) available on order.

**Personnel:** E. D. Gilmore, president, C. E. Post, vice-president, A. D. Fawcett, secretary, G. E. Post, chief engineer, R. E. Kline-Brockmeyer, chief engineer.

#### Elastic Stop Nut Corporation

Manufacturers elastic stop nuts made from steel, brass and aluminum in all types including hex, washer, block, cylindrical, conical, right-angle, ring, closed, etc. Available also in a newly developed fluid type and lock-washer.

**Personnel:** A. Strommen, president, H. B. Thorne, vice-president.

#### Engle Aircraft Specialties

Special features of landing, nose ring and exhaust control. Specialists in all types of metal landing, by drop hammer, power hammer, or spinning.

#### Ex-Coil-O Aircraft & Tool Corporation

Tool contract manufacturers, precision parts for aircraft and aircraft engine builders. Parts are available in practically any material to particular specifications.

**Personnel:** M. A. Winters, president, Philip Maher, vice-president, W. J. Winters, chief engineer, J. J. Winters, chief engineer.

#### Fairair Boating Company

Fairair aircraft type bearings are designed particularly for aerodynamic use. The line includes the FK double ball and cartridge type, the K series double ball and type, the KC series screw type, the KT series



Ball bearing

double ball and self-aligning type and the AS40 series torque roller type. These bearings are specially light weight, compact and accurate standard.

**Personnel:** Miss Steiner, president, C. P. Steiner, vice-president and chief engineer, A. G. Wey, treasurer, S. M. Cooper, secretary, E. E. Carter, chief engineer, G. L. McLeod, assistant chief engineer.

#### Fairchild Aircraft Engine Corporation

Over 20 years' experience in the design and construction of aircraft engines and engine mounted accessories for various purposes, both military and commercial. Recent specialty in engine equipment including 8, 9 and 10 ton engine systems. A comprehensive type catalog is available for reader perusal. Photocopying accessories available include: portable light photocopier, laboratory, engine camera, main camera, large contact printer, various new fluid light films, etc. Latest addition to the Fairchild line is the K-series engine, gas, lighter position holder, and other accessories.

**Personnel:** J. E. Oglethorpe, president, J. W. Lutz, vice-president, W. B. Schaefer, secretary-treasurer, J. P. Oglethorpe, chief engineer, C. B. Fleming, chief engineer.

#### Federal Aircraft Works

Products of this company is its reputation for accuracy. Also use of lightweight construction of steel and metal, use adaptable for attachment to landing gear of many type of airplane.

**Personnel:** P. E. Dine, A. A. French, secretary.

#### The Fitzgerald Manufacturing Company

Manufacturers of products of practically all types, engine materials.

**Personnel:** J. E. Fitzgerald, president, M. D. Fitzgerald, vice-president, M. F. Fitzgerald, treasurer, R. G. Ford, secretary and chief engineer.

#### Fleetwings, Inc.

Manufacturers of standard steel and aluminum for aircraft. Products include complete aircraft, also a wide range of parts including complete wings, tail sections, and other parts, fuel tanks, etc.

**Personnel:** Carl DeGroot, president, J. J. DeGroot, vice-president, A. M. Carlin, secretary and treasurer, W. E. Carlin, chief engineer.

#### Ferris Insulation Company

Plant insulators, rubber and built-in insulation, also the Ferris insulation plants for other insulations, combine the products of this company.

**Personnel:** D. J. O'Connell, president, W. G. Dwyer, vice-president, R. W. Lyle, chief engineer.

#### F. & G. Manufacturing Company

Products include all engines, nose engines, and engine mounting brackets for the aviation industry.

**Personnel:** A. J. Fink, president, J. Fink, secretary, vice-president, Charles Dine, treasurer, S. J. Avon, secretary.

#### Garlock Packing Company

Products are water pump and ball joint packings, products of asbestos, fiber or rubber, use in any shape, oil and rings of rubber for compression, also sheets for pressure, asbestos heat all types, gaskets, shock absorber packings, vibration dampers.

**Personnel:** G. L. Abbott, president, Philip Abbott, vice-president, a change of sales, R. M. Wolfe, secretary.

#### General Cable Corporation

Manufacturers of the following cable accessories (flexible hoses, standard cables, etc.): aircraft cable (aerobically armored underground cable), petroleum cable (synthetic rubber protected), rubber-covered wire, stainless steel cable (aerobically armored underground cable), welding cable, in addition to these aircraft cables, the

#### Announcing the

## JACOBS L<sub>5</sub> 285 H. P. ENGINE

**Rated: 285 H. P. at 2000 R. P. M.**

**Weight: 460 pounds.**

**Overall Diameter: 43½ inches**

**Gas Consumption: 15 to 17 gallons per hour.**

The Model L<sub>5</sub> is based on the proven engineering of the Jacobs L<sub>4</sub> 225 H. P. engines, whose recognized efficiency has also been increased for 1936 through progressive refinements in design and construction.



## JACOBS AIRCRAFT ENGINE CO.

POTTSTOWN, PENNSYLVANIA



*insurer, Fredrick Glenshaw, chief engineer.*

#### Harvey Radio Laboratories

A specialists in the aircraft field, this company is offering the type 3005 radio transmitter for airport and traffic control use.

*Personal: James B. Parker, general manager.*

#### Hayes Industries, Inc.

THIS COMPANY HAS TAKEN OVER the assets of the American Wire and Spring Company and manufactures aircraft wheels and bridle under the trade name Avialite. Products include a complete line of low-pressure landing wheels with mechanical or hydraulically operated bridle, low-pressure tail wheel; also a complete line of disc wheels and bridle on all wheels used front either with mechanical or hydraulic bridle. Disc wheel tail wheels are also available.

*Personal: C. H. Hayes, president, Clarity H. Hayes, vice-president; E. C. Hildner, secretary and treasurer.*

#### Heiste & Kaufman, Ltd.

AIRCRAFT products include automatic systems and air controls, air-vent assemblies, instrument tubes, generators, power plants, radio wiring cable, and other aircraft radio equipment.

*Personal: E. M. Heiste, president, Jack Kaufman, vice-president and treasurer.*

#### Hill Aircraft Streamliners Company

Specialists for many years in all types of streamliner streamliners and streamliners for aircraft, barges, boats, fuel and oil tanks, etc.

*Personal: John A. Hill, president; E. M. Hill, secretary.*

#### Honolua Valve Manufacturing Company

HYDRAULIC lines, manufactured by this company is widely used in aircraft maintenance and service, known for cheap service and quick parts.

Available in land and portable form.

*Personal: H. R. Schlemmer, president; H. F. Schlemmer, vice-president; P. E. Schlemmer, secretary, J. M. Foss, chief engineer.*

#### Ideal Clamp Manufacturing Company

Products available for the aviation industry are hose clamps (all types),

grip hose bands, sheet terminals (internal), banding.

*Personal: Francis Knick, president; C. F. Knick, vice-president; J. J. Knick, secretary, chief engineer; Philip Knick, secretary, sales manager.*

#### Industrial Engineering & Manufacturing Company

THIS COMPANY designs and manufactures aircraft parts (brakes, landing gear, shock struts and hydraulic mechanisms) and also specializes in stainless steel stamping.

*Personal: E. Kitchner, owner, M. Williams, secretary.*

#### International Fluor Signal Company

COMPLETE LINE of signaling devices includes parachute flares (1, 1½ and 3 second duration), parachute signal lights (18 to 25 seconds duration), rocket signal lights (18 to 25 seconds), flare pyrotechnics (1 to 3 minute flares), also flare candles, flare mounting brackets and other accessories.

*Personal: A. F. Halstead, president; H. B. Halstead, vice-president; E. L. Briggs, Jr., secretary, chief engineer.*

#### Irving Air Chair Company

ONE MEMBER OF THIS COMPANY is particularly well known for its products. All types of chairs for military and commercial use are available, including top-back, and seat-backs also quick detachable seats, also chair stems.

A new type of baron has recently been developed for transport use which is suitable for both land and water.

*Personal: George Bruce, president; J. L. Gray, vice-president; D. A. McLeod, secretary; E. N. Ford, treasurer.*



Kellman precision chronometer

#### Julius P. Price & Son, Inc.

MANY FACTORS are important for meteorological and hydrographic observations including means involving wind indicators and anemometers, weather observation stations, both for ground use and for use on aircraft making reports on conditions.

*A division of Julius Shuster Corporation.*

#### J. V. W. Corporation

THIS COMPANY controls the distribution of the Lash ground factors, a device for locating holes in a body, such as a ship, in minutes in airplanes in fact, find with full confidence of mapping instruments and rules.

*Personal: C. J. Jones, George F. Jones, chief engineer.*

#### Walter J. Kilde Company

SPECIALISTS in low extruding equipment for use on board aircraft. Low fire extruding systems are widely used on transport and military vessels of all types. Recently Low equipment has been made available for installation on presently used aircraft.

*Personal: Walter Kilde, president, Walter Kilde, vice-president; C. L. Lane, treasurer, secretary; Clifford Davis, sales manager; C. L. Griffin, in charge of sales engineer.*

#### Kellman Instrument Company

KELLMAN'S instruments are now to be found on boards of coast transport and military aircraft all over the world, as well as on a large number of privately owned craft. Products include: aneroidometers, air speed indicators, altimeters, attitude and heading indicators, altimeter air temperature gauges, clocks, compasses (including gyroscopic), engine speed units, fuel quantity gauges, fuel pressure gauges, magnetic indicators, fuel light indicators, landing gear warning units, manifold air temperature gauges, main fuel pressure gauges, oil pressure gauges, pressure warning units, propeller speed and shaft angle indicators, engine speed indicators, tachometers (compressors) and magnetos, torque dynamometer (C.O.), variable speed rate meter, vibration meters, continuous braking systems, engine instrument clamps. Under development: electric tachometers, turn indicators, remote indicating systems.

*Personal: Paul Kellman, president, Walter Kilde, vice-president, C. E. Adolph, secretary, Walter Kilde, sales manager, V. Corbetta, chief engineer.*

## EDO FLOATS



EDO AIRCRAFT CORPORATION  
600 Second Street, College Point,  
Long Island, N. Y.



## GIANTS of the SKY are EDO-EQUIPPED

To increase their usefulness economically and reduce their range of operations, an increasing number of large planes, passenger and military, are being converted for seaplane use with Edo Floats.

The operating advantages of Edo-equipped seaplanes are important. Well above the water, passengers are both protected and insulated from the noise and shock of waves. Their vision is never obscured by spray. Salvaged aircraft, if struck, do no harm to the plane itself. Edo Floats are devoted into as many as 200 permanent built-in watertight compartments—they are afloat. If a float is damaged the ship may still be kept in service by quickly installing a temporary replacement float, while float repairs are efficiently made in the shop.

Large seaplanes, Edo-equipped, are easily handled. When taking at slow speeds, steering is facilitated by EDO's patented automatic water rudders. Docking is quickly accomplished, without large handling crews, by sliding the seaplane out of the water on the keels of its rugged floats.

For military use, the convertibility of seaplanes into land planes is well known. The utility of any given number of machines. Business, moreover, can follow the standard, or foreign, beach bay. For long flights, reserve gasoline tanks may be fitted into the floats—requiring no change of aircraft facilities.

There are available today a number of large transport planes which can be changed over quickly and economically into efficient seaplanes with Edo float gear. Persons interested will receive complete literature.

**Leas Developments, Inc.**

MANUFACTURES radio equipment exclusively, including the following operations: Line D-type radio equipment; American Radio; aircraft radio transmitters; aircraft ground stations; aircraft receivers; blind landing systems. Personnel: W. P. Lee, president; J. G. Johnson, vice president; A. C. Miller, secretary.

**Lewis Engineering Company**

SPECIALIZES in temperature measuring devices for instrument board and test use as aircraft. The company's products include: temperature indicators; calibrated to various scale systems and with variously labeled dials (in Fahrenheit); thermocouples, both of the gasket and stud type (copper thermocouples scale in order); thermocouple leads of the two-conductor type with suitable insulation; auxiliary and integral switch switches (study type in case for instrument board mounting to handle from 1 to 25 amperes). Personnel: Blaine W. Lewis, Jr., president; C. S. Austin, treasurer, secretary, sales manager—Michael Johnson, chief engineer.

**Littlefuse Laboratories**

ADVANCEMENT in research and testing that company's products are compact and rugged type built for the protection of electrical circuits. Personnel: E. P. Little, president and chief engineer; E. Kolb, vice president and treasurer.

**Macwhitty Company**

PRODUCES aircraft radio in fixed and adjustable, fixed and variable and (both in professional and non-professional types) also sold its radio communication, radio, sound. Personnel: G. S. Whitty, president; J. S. Whitty, vice president and general manager; H. B. Whitty, treasurer; W. G. Whitty, secretary; R. G. Dault, sales manager; E. B. Whitty, chief engineer.

**Mathis-Rockwell Corporation**

AVIATION products: Single row ball bearings; double row ball bearings; single row, narrow type bearings; aviation wide ball bearings; radial axle bearings; superduty bearings (precision).

**E. B. McPownitz**

PRODUCES: Aeronautical aerials. Personnel: E. B. McPownitz, president; W. N. Cook, vice president.

**Nichols-Bentley Airplane Co., Inc.**

DISTRIBUTORS of all types of airplane and engine accessories. Personnel: Donald Nicholas, president; C. H. Pachter, vice president; Clay Thomas, treasurer; Howard Bentley, secretary; C. A. Hall, sales manager.

**Packard Electric Corporation**

PRODUCES include all types of high tension and secondary electrical coils for aircraft use (one, two or three coils), with glass, bakelite and metal dielectric cores. Personnel: E. N. MacGowan, vice president; G. G. Cox, sales manager; equipment division; H. G. MacGowan, sales manager; L. E. (Phelan), chief engineer.

**The Palmit Company**

OWNER product is a master short hand spring steel lock set used in many aircraft and engine builders. Personnel: J. B. Albrecht, president and chief engineer; A. M. Berg, vice president and sales manager.

**Parker Appliances Company**

PRODUCES products include a wide range of hardware and fittings for aircraft fuel systems. Also have available tools and equipment for this hardware also. Equipment table assemblies have been set up according to specifications.

**Parker-Kulon Corporation**

MANUFACTURES fastening devices, including self-closing screws, drive screws, wing nuts, turn-buckle, etc., and, in a wide range of aircraft and auto.

**Parfekt Circle Company**

MANUFACTURES all types of film and photo view tools for aircraft engines. Personnel: C. N. Taylor, president; Arthur Taylor, vice president; L. B. Davis, secretary-treasurer; D. M. Taylor, sales manager; A. R. Taylor, chief engineer.

**Pioneer Instrument Company, Inc.**

AVIATION products now include an extensive line of instruments, air speed indicators, altimeters, accelerometers, compasses, bank indicators, rudder indicators, clocks, compasses (compasses and air indicator), drift indicators, fuel gauges, manifold pressure gauges, oil pressure gauges, tachometers, etc.

**Weston thermocouple switch**

*2 P. Sillable, electricity and pressure; W. H. Cook, sales manager.*

**Mete Motor Cages & Equipment Company**

PRODUCES Oil and fuel pressure gauge systems, vacuum gauges to varying indications, thermometers for aircraft. Personnel: R. G. Metcalf, president; W. F. Davis, secretary and treasurer; A. Weiss, sales manager; L. R. Metcalf, chief engineer.

**Motive Improvements, Inc.**

COVER available product is a line designed as auxiliary equipment to auto manufacturers in Electric Aviation. A portable line (flexible) for use on gasoline driven lines that include. Personnel: J. A. Gordon, president; R. H. Lyle, vice president; H. W. Taylor, secretary; T. M. Cook, secretary; J. M. Clarke, chief engineer; L. W. Williams, chief engineer.

**New Departure Manufacturing Company**

PRODUCES Bell houses for all purposes. Personnel: Delbert Pace, president; J. G. Taylor, vice president and general manager; M. S. Proctor, treasurer; L. G. Seymour, secretary.

**Norma-Hellman Bearings Company**

NORMA—Bentley precision ball, roller and thrust bearings have wide application in the aviation field in all types of engine, engine accessories, instruments, radio equipment, airplane accessories and landing field equipment. Personnel: W. H. Young, president; D. P. Wilson, vice president; M. J. Fisher, sales manager; G. R. Rice, engineering manager.

**WESTON Model 402  
Cylinder Temperature Indicator****WESTON Model 406  
Carburetor Air Temperature Indicator****WESTON Model 416  
Oil Temperature Indicator****WESTON Model 402  
Radio Compass Indicator****WESTON Model 504  
Volt-Ammeter**

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(Model 724-B)

embodying these important new features



**EFFICIENT STATIC BRUSH**  
—efficiency, complete protection to make engagement

**STURDY PLUG TYPE CONNECTOR**  
—provides a quick and simple method of connection

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—new material provides long life in service

**INCREASED VOLTAGE**  
—providing even better temperature compensation

**RUGGED CONSTRUCTION THROUGHOUT**  
—Simple maintenance feature

These and other features of the newly designed WESTON Tachometer merit immediate investigation. Full data on Model 724-B, and other WESTON instruments for aircraft service are available . . . Weston Electrical Instrument Corp., 616 Frlinghuyzen Ave., Newark, N. J.

# WESTON Instruments



**SKF Industries, Inc.**

Manufacturers of ball and roller bearings in a wide range of sizes and types with many applications to aircraft engines and aircraft assemblies.

**Personnel:** Dr. W. L. Orr, president; E. E. Dodge, vice-president; T. W. Doolittle, secretary-treasurer; R. H. Dwyer, sales manager; G. F. Allen, gen. chf. engrs.

**Sky View Camera Company**

Manufacturers of the Sky View camera, a handfield type designed primarily for the private pilot.

**Personnel:** E. W. Carter, president.

**Soler Aircraft Company**

Manufacturers of exhaust manifold systems for aircraft engines. Manufactures also of burners for stoves, tanks, etc.

**Personnel:** E. T. Price, president; C. S. Marston, vice-president and secretary; J. P. Swanson, chf. engrs.; A. W. Briggs, treasurer.

**Speer Gyroscopic Company, Inc.**

Manufacturers of gyroscopic instruments and instruments including the Speer horizon and the directional gyre. Developed and now manufacture the Speer automatic pilot which is a fully completely automatic flying control for aircraft. Now in use on many commercial and military airplanes. Among recent Speer activities is the manufacturing of aerials. Speer's gyroscopic has been used on such recent transports as the Douglas DC-2, the Martin 130 and other large airplanes.

**Personnel:** R. B. Gilmore, president; F. R. Bauer, Alexander Strick, Robert D. Lee, vice-presidents; Cleveland Wilkins, treasurer; R. C. Thompson, secretary; E. B. Lee, sales manager; C. R. Bauer, chf. engrs.

**Steel Products Engineering Company**

Manufacturers for the aircraft industry of: aircraft engines and parts, gears, gearbox components, fuel tank systems, automatic fuel valves, single cylinder fuel systems.

**Personnel:** L. E. McWhorter, president; E. L. Taylor, R. C. Goldman, vice-presidents; J. B. McWhorter, secretary; E. W. Clark, secretary; W. C. Arnold, general manager.

**Stempel Pnc Extrusion Machine Manufacturing Company**

Manufacturers of hot extruders, also of cold chills, roller gloves,



Stencils etched engine



Speer automatic pilot

stays gearbox case and thermal systems.

**Personnel:** W. D. Green, president; F. W. Green, vice-president; Grant Taylor, treasurer; Gordon Simpson, secretary; F. M. Green, sales manager; H. O. Lohs, general manager.

**Stewart-Hartbeek Company**

Manufacturers of aircraft fuel tanks, both automatic fuel system section, and accessories for sale.

**Personnel:** Stewart Hartbeek, president; F. A. Ford, vice-president; J. W. Lingo, secretary-treasurer and sales manager for aircraft fueling; R. W. Brada, chf. engrs.

**Summerill Tubing Company**

Produces machine oil pipes, lines and stages of aerodynamic and tubing. Also, various types of tubing and valves fabricated in a single code line stock.

**Personnel:** E. L. Parker, president; J. P. Davis, vice-president; C. F. Koster, secretary-treasurer; J. P. Davis, sales manager; R. K. Lawson, chf. engrs.

**Suncoast Mills**

Manufacturers a complete line of Grade A airplane fabric and tapes as well as balloon fabric and reinforcing tape in accordance with A-N specifications.

**Personnel:** W. E. Peabody, president; J. L. Wahl, treasurer; J. Ditzel Jr., sales manager.

**Swift Lubricator Company**

Direct product of aerodynamic interest is the Swift water-tight fuel valves designed to prevent water being sucked out of gasoline storage tanks. The valve is adaptable to all tank tanks.

**Personnel:** C. W. Swift, president.

**Swirkle Parachute & Equipment Company**

Manufactures parachutes for commercial and government pilots. Chutes available in white or orange with or without hook, quick attachable, close or close type. Manufactures also of flying suits, helmets and safety beds.

**Personnel:** Stanley Swirkle, president; F. W. Swirkle, vice-president; Walter Swirkle, secretary; W. H. H. Clark, chf. engrs.

**Thinker Corporation**

Timken synthetic rubber products have a variety of uses in the aviation industry. May be used on any gasoline and oil-treated hose, pistons, etc. Thinker powder also available to be molded into various shapes.

**Personnel:** David Longworth, president; J. C. Parvick, vice-president; M. J. Richards, secretary-treasurer.

**Thompson Products, Inc.**

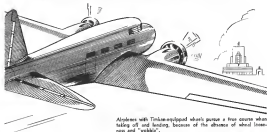
Well known in the aircraft engine industry are Thompson valves. Available in both the cold and hollow automatic types. Hollow piston components, especially pure valves, which are as a coolant. Valve seats are glass or Stellite metal. Longer surface of valves ground and polished all over. In addition to valves the company manufactures: valve seat inserts, pistons, piston rings, tappets, and valve hardware and ground alloy and pistons.

**Personnel:** F. C. Crawford, president; J. M. Clark, vice-president; W. M. Albright, secretary-treasurer; L. M. Clay, sales manager; A. T. Caldwell, chf. engrs.

**Timken Roller Bearing Company**

Manufacturers bearings for use in aircraft engine roller cases and in engine landing wheels.

# Easy Take-Offs— Smoother Landings WITH TIMKEN-EQUIPPED WHEELS



Aircraft with Timken-equipped wheels pursue a true course when taking off and landing, because of the absence of wheel looseness and "wobble".

Timken-equipped landing and roll wheels have practically eliminated ground bumping and other uncertainties. They operate smoothly and steadily as the wheels as your automobile—and are just as dependable.

Aircraft wheels are only used for a few minutes at the beginning and end of a flight—but those few minutes are vital. That is why an overwhelming majority of modern airplanes of all types and sizes—from tiny single seaters to giant transports—have Timken-equipped wheels. It will pay you to see that you get them on your planes.

## Timken Rocker Arm Bearings Improve Engine Performance and Increase Dependability

Friction and wear are superseded by smooth, wear-free operation when Timken Rocker Arm Bearings are installed. Lubrication is simplified. Bearing replacement is no problem. Maintenance cost is cut.

The value of Timken Rocker Arm Bearings has been definitely proved and is being demonstrated every day by their performance in leading makes of radial engines. It will pay you to have them in your engine.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

# TIMKEN TAPERED ROLLER BEARINGS







## RCA EXPANDS AVIATION LINE!

Adds newly perfected airplane transmitters and receivers, including compass receiver... Featuring reliability, ruggedness, light weight, low costs, high quality

NOW RCA announces several new aviation radio instruments, making the RCA line more complete than ever before, expanding its usefulness to cover every aviation need. All RCA receivers, transmitters and accessories are backed by years of experience in every radio communication field. Conversion of this experience to aviation purposes has been accomplished with the

assistance of pilots and airport operators. RCA owns and operates its own planes, and conducts a hangar at the Garden Airport. It knows aviation radio, is familiar with every requirement and need, and how to fill it to the utmost satisfaction of the user. See this complete line, every item of which is a practical, efficient and economical unit.

### FOR AIRCRAFT

#### NEW!



RCA AVE 7 and 7A Aircraft Transmitters. Offer economical system by 100% modulated high speed radio telephony, as CW telegraph. These new, sturdy, lightweight transmitters have 10 watt power in phone and CW. AVE 7 has a battery power unit and weighs 28 pounds net. AVE 7A has a dynamo power unit, weighs 26½ pounds net. Both operate off standard 12 volt battery supply. Primarily designed for the standard Rycal Phone or CW in either of two pre-determined frequencies are instantly selected in flight by flipping a switch.

**NEW!** RCA AVE 12 and 12A. Offer the same basic features of the 7 and 7A, but have higher power, AVE 12 having 10 watts on phone, 25 on CW, AVE 12A, 30 watts on phone, 45 on CW. Weighs 40 and 57 pounds respectively. Both use dynamo power supply. Any one of three pre-determined frequencies may be selected in flight. The outputs in repeat contained in their transmitters will be active AVE 7 and 7A.



**FAVORITE!** RCA AVE 7 and 7A Aircraft Receivers. These two 6-tube super-heterodyne receivers have proved exceptionally popular during the past year and are no longer found only on ships in all parts of the country. Known receiver. Operates from 6 or 12 volt battery, no outlet is even required. AVE 7 offers reception on the battery and communication bands, AVE 7A on the battery and communication bands. Ideal companions to the AVE 7 and AVE 12.



#### COMING!

RCA AVR 8 Radio Compass. The new instrument will shortly be announced. Its price will be low as its quality will be high. Watch for the initial offering of this remarkable new instrument.



### FOR AIRPORTS

RCA equipment for airports is built to meet the practical requirements of ground operations, combining technical excellence with rugged reliability, operating simplicity and low cost. The transmitting equipment is especially noteworthy for its non-

obsolescence feature. This equipment is built to remain what you the pilot of a serviceable airplane, permitting growth from time to time as additional facilities are required, with little or no scraping of original units. This plan is additional proof of RCA value.

### NON-OBSOLESCENCE

RCA AVE 6, 125-watt Biphasic and Beacon Transmitter. This is built upon the AVE 1A, with the addition of the power amplifier and beacon units. This feature allows for growth.

RCA AVE 1A Airport Radio Traffic Control Transmitter provides 100% modulated high quality telephony over the required aviation bands. Completely self-contained. Operates from 110 volt AC. Power is constant, 25 watts into two sufficient antennas allowing custom range of 10 miles. May also be used for CW and RCT. Where not on the air, can be used as speech amplifier for airport public address system.



RCA AVE 1A Airport Receiver. A 6-tube super-heterodyne, all-wave receiver, including low frequency amplifier for rapid tuning of telephone signals, and for reception of CW. Provides for loud phones. The sensitivity and power of this receiver enable it to detect a signal as far as 10 miles and a local and steady volume suitable signal from distant or weak transmitters.



RCA AVE 4 receiver of the AVE 2 plus an antenna unit, which consumes power 10 125 watts. Note advantage of RCA coordinated design.



RCA AVE 3 Airport Communication Transmitter. 15 watt power, 100% modulated telephony, CW and MCW or three high frequency channels. Completely self-contained.

RCA AVE 4 Airport Receiver is a super-heterodyne receiver, especially designed for reception on the telephone frequency and the 110 volt AC. Provides for loud phones. The sensitivity and power of this receiver enable it to detect a signal as far as 10 miles and a local and steady volume suitable signal from distant or weak transmitters.

**TAXIUP!** Shows RCA Aviation Headquarters in Central Airport, Camden, N. J. All RCA aviation equipment is on display and demonstration. We'd like to show you just what you can expect to look over at the show.



AIR ASSOCIATES, INC., Glendale, Cal.; Chicago, Ill.; Garden City, L. I.

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**RCA MANUFACTURING COMPANY, INC.**

Camden, N. J. A service of the Radio Corporation of America

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# AVIATION

## for April

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Everyone having a business interest in American aviation will want this factual review of the previous year's progress.

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# Editorials

## AVIATION

### 8500 Fine

**T**UCKED away in the regulations now in force governing international traffic is some, much said and implemented of war, is one of these many little strings that have appeared as byproducts of many pieces of New Deal legislation. As much, it is difficult to discover whether this one was slipped in with malice aforethought or just happened. What ever the reason, manufacturers of aircraft, engines, and certain parts have lately awakened to the fact that Uncle Sam has moved police on them that it will cost them just \$500 for the privilege of staying in business.

The obvious intent of the regulations governing the international traffic in arms was to give the government some degree of control over munitions of war exported to other countries. Section 2 of the Joint Resolution covering the case (Dept. of State Publication No. 794) says in part, "within ninety days after the effective date of this Act . . . every person who engages in the business of manufacturing, exporting, or importing any of the arms, munitions, or implements of war referred to in this Act, whether as an exporter, importer, manufacturer, or dealer, shall register with the Secretary of State . . . and . . . every person required to register . . . shall pay a registration fee of \$500. . . ."

¶ With that we have no quarrel. With international relations as delicately balanced as they are today it seems only a measure of good sense to keep a restraining hand on all possible exporting elements. And certainly (and without any intent to make a bad pen) the munitions business contains plenty of dynamite.

The joker appeared when, acting under the authority of the bill, a proclamation was issued from the White House defining the terms "arms, munitions, and implements of war."

First direct reference to aircraft comes in Category III which classifies as munitions "(1) Aircraft, assembled or disassembled, both heavier and lighter than air, which are designed, adapted, and intended for aerial combat by the use of machine guns or of artillery or for the carrying and dropping of bombs, or which are equipped with, or which by reason of design or construction are prepared for, any of the

appliances referred to in paragraph (3) below; (2) Aerial gas mounts and frames, bomb racks, torpedo carriers, and bomb or torpedo release mechanisms."

So far so good. Beyond all doubt here is a clear and comprehensive definition of what constitutes aerial munition and so such has proper place in a munitions control act.

¶ BUT—Category V further defines as munitions of war "(1) Aircraft assembled or disassembled, both heavier and lighter than air, other than those included in Category III; (2) Propellers or air screws, fuselages, hulls, tail units, and undercarriage units; (3) Aircraft engines."

Believe it or not, by Presidential definition every single aircraft, from glider, sailplane, power glider, light plane, sportster and up to a military plane. A Flying Flea built as a collier or gopher is an implement of war. Every 2, 3, or 4-cylinder engine, pushing out its 50 or 55 hp. is in the same class as a machine gun or a tank of stored gas. Every motor-suck propeller, every set of airplane floats, every shock absorber unit, every landing wheel, and even every set of tires is a lethal weapon. And everyone who sets himself up to make or sell or deal in any such article makes himself immediately liable to a \$500 assessment.

Now it is necessary to have any intention to ship any of these products outside of the country. The only qualifications for assessment under this Act is engaging in the business—"whether as an exporter, importer, manufacturer, or dealer."

To the big manufacturers who are actually interested in the export market and to certain New Dealers, \$500 may seem scarcely worth mentioning. But to a lot of people it is still a lot of money. To many a small manufacturer (most of whom never considered themselves as military manufacturers or as exporters) it may amount to consideration of a considerable percentage of the year's profits. It is difficult to understand why, if a licensing arrangement seems to be the answer, the assessment needed to be as high. Simply as a registration fee, \$5 should be ample.

¶ We are willing to take a charitable view of the situation and concede that the interpretation of the Act is far beyond the original intent. The joker probably slipped into the dock by mistake. The solution lies in the complete elimination, or at least some drastic modification of Category V to exempt all aircraft that are potentially of no serious military significance, as was done for small arms in Category I. It could be done simply by a new proclamation from the White House. Here is a chance for the President to correct an obvious injustice, and to prove to a somewhat skeptical industry that his administration is willing once in a while to pass up an opportunity to crack down on an industry.



Martin-built ships of the China Clipper type already have proved their capacity for trans-Atlantic service. Carrying bundles to China for Pan-American Airways, they span for greater distances, and make for longer non-stop flights, than are involved in any of the proposed U.S. to Europe routes.

THE GLENN L. MARTIN COMPANY  
BALTIMORE, MARYLAND

Builders of dependable aircraft since 1920



## Greatest Striking Power!

In close cooperation with the U. S. Air Corps, the Glenn Company is producing bombing planes which provide the greatest striking power the national defense ever developed in any country. Glenn bombers are not only the world's fastest new in service, but are highly maneuverable even when heavily loaded with bombs and fuel for long range use.

**THE GLENN L. MARTIN COMPANY**  
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Builders of dependable aircraft since 1909



\* **Transport** . . . Witnesses at Senate safety hearings criticize administration and operation of ground navigation facilities . . . Two Air Corps rules against himself on off-base competition with American and on wage scale charges . . . Coastal Airlines reports phenomenal 1935 increase . . . American orders 100 more Douglas . . . T.C.C. funds mail route for National Airlines System . . . TWA experiments with four-engine craft . . . United Air Lines opens new employment program with appropriation for ten 20-passenger Douglas transports.

\* **Army and Navy** . . . Air Corps completes New England test of water technique in operations over land at Concord, N. H. . . . Marines examine in Caribbean . . . Navy gained battle of western coast of South America . . . Carrier forces with fleet in exercises out of San Diego . . . House of Representatives seeks round Air Corps equipment appropriation to Senate.

\* **Foreign** . . . Intercontinental commerce negotiates trans-Atlantic agreement with German interests.

\* **Engineer flies Air** . . . Duxford Committee recommends resumption of Navy activity program.

\* **Industry** . . . Details released on new variable seating . . . Messers and Ryan report new levels of production . . . Consolidated manufacturers work on parachute wing growth in Bell Aircraft Corp. . . . General Wright starts production on new trainers in St. Louis plant . . . Cessna leaves London agent . . . Beechcraft delivered to French pilot.

\* **Fleet** . . . Douglas, Northrop, Lockheed, North American, Ford Aircraft and Irving all show net profits in 1935 statements.

# News of the Month

## Safety Measures

Senate's investigation of airline safety turns into critique of Air Commerce Bureau navigation aids.

"Let us say this, we are aware of the investigation which has been made in the past. We are familiar with the Pull investigation of 1931, and the House investigation of 1931, as well as the work of the Baker Board of 1934, and particularly the aviation investigation of 1935 . . .

"Now . . . let us ask this question: In our experience and observation, what specific details in the management, material and regulation of air traffic could be and should be recommended by the committee for the purpose of promoting safety for air traffic in any and all respects? That may be the last time meeting for our discussion."

Then Senator Reed E. Copeland called his preamble Feb. 19 to the long-delayed hearings on air line safety by the Senate Committee reported after the death of Senator Capper.

Airline officials, many of another sympathetic Senatorial opinion, leaved right at night on the memorable grounds was followed by good after proof of the committee's constructive intentions.

As the week slipped by, airlines after without prior industry fragments. Legation W. Rogers, president of the Aero Club of America—"We find, had I believe the accident statistics . . .

lower rate, that comparatively a small percentage of the accidents are due to structural failures . . . The one point I can make is, however, more convincing. It is the government's greatest bearing to do with progress and development in the manufacture of aircraft."

C. B. Smith, president of American Airlines—"We have a good many routes in the United States, including some we operate, that have no (ground) aids at all . . . When we started in the aviation business . . . most . . . times had no schedule a day and a certain weather reporting system was adequate . . . Some have ten or fifteen schedules a day now . . . and weather facilities adequate several years ago are out at all adequate today."

J. W. Williams of TWA—"Near the airport normally we need very exact control of traffic . . . (for it) we need

additional radio range stations in the westernmost vicinity of these terminals."

"We need much stronger beacon lights in the fields . . . We need more reliable observations for our present method of weather analysis."

Carl Datto, assistant investigator, formerly aviation expert for the Post Office, charged that in order to save about \$2,000 the Air Commerce Bureau had replaced 1,200-watt surface beacon lights with 500-watt ones, that in field terms frequently spaced hours of darkness, that the Bureau's accident reports had never blamed the flying error or any of its services. Datto also pointed out that in spite of poor navigation aids and consistent operating losses the airlines themselves had maintained high standards for equipment and maintenance, had in fact improved the airlines safety record five-fold since 1927.

Harry P. Greyhound—argued open crash inquiries and better airport facilities, gave point to the last criticism by reference to the inadequacy of Westchester's own air terminal.

Jack Fife, TWA, president—bald of business that airlines charges carried out without notice to airlines.

E. S. Glenn, president of the Air Transport Association—presented a map showing what additional and improved ground aids the airlines specifically wanted. Estimated cost \$14,000,000.

Jay Albert Shank, in charge of security construction and maintenance of airports for the Bureau in 1934, topped all others in Bureau criticism—On an inspection of 14 flying fields (mostly) equipped everywhere in flying fields, in houses, in open fields, none of it cutting in the states in which it was equipped was good. Finally, he claimed he had been disabused from the Bureau for revealing his findings to the Senate Committee.

The latter statement was vigorously denied by Rex Martin. Other allegations of political interference with personnel had Eugene Vidal to state the Bureau had no personnel in the last two years and a half. Because, officials and other facilities were not ade-

open, he admitted, but he denied that reporters were negligent.

Empowered only to make routine resolutions to the Senate the committee at the end of the work announced it would resume hearings "later."

## Pact with Reich

Agreement permits German participation in Trans-Atlantic services.

TWO MONTHS after announcing the completion of negotiations with British authorities clearing the way toward a British-American service across the North Atlantic, R. Walden Mason, chairman of the interdepartmental committee on international civil aviation had another statement to issue.

Early in February a German mission, consisting of Willy Fock, chief of the general air office of the Air Navigation Ministry, Dr. Martin Wittenberg, assistant director of the Luft Hansa and Heinrich Thomas of the Ministry of Posts, arrived in Washington to negotiate for German participation.

Feb. 24 Mr. Mason told the press: "Discussions with regard to the organization of air traffic across the North Atlantic which have taken place during the past week between the representatives of the United States and a German delegation have satisfactorily concluded today."

"The conversations, involving a large field of problems concerning trans-At-

lantic air traffic, have been discussed in detail and the following understanding reached:

"The Department of Commerce is prepared to make the full facilities under the control of the United States Government available to any German company or companies for use in carrying out superoceanic flights during 1938, the German Air Ministry having offered to reciprocate in kind except through the use of similar facilities under the control of the German Government."

Based on the results of the experimental flights, both governments will consider possible methods of arranging for regular service.

"Members of the German mission

## The Transport Month

Brantiff restrained from Tulsa service by P. O. Central reports big growth in traffic. American and United each order ten big Douglasses.

IN THE absence of any such important service developments as have been reported in the two previous issues of AVIATION, chief item of concern remains in February traffic developments was a Post Office bulletin headed down Feb. 15 in the Brantiff case.

Some months ago American Airlines and the Airline Pilot's Association had both filed complaints with the Post Office. The former alleged that Brantiff

violated the present Air Mail law's office provisions in operating a Dallas-Chicago service via Oklahoma City, Tulsa and Kansas City in competition with American's Dallas-Chicago service via Oklahoma City, Tulsa and St. Louis. The latter alleged that Brantiff was violating the wage scale provision of the same law especially in its rate of pay for co-pilots.

Branding the charges correct in both cases the Post Office ordered air and compensation schedule. Since Brantiff could it issued such variations. Furthermore it set Feb. 25 as the deadline for a Brantiff choice between compliance and cancellation of its air mail contract.

As a consequence Brantiff Feb. 25 announced the discontinuance of its long summer 3 and 6 northbound, and its summer 12 northbound service.

Brantiff had recently released traffic figures showing a phenomenal growth during the last half of 1937, passenger carried was 378 per cent over those carried during the last six months of 1936. Revenue was up 738 per cent. Furthermore December figures showed an increase over those of 1935 of 467 per cent in mail payloads, and 48 per cent in express.

Central Airlines also reported big increases in 1937 traffic over 1934 figures. Passengers carried 207 per cent; air mail payloads 92 per cent; express payloads 230 per cent.

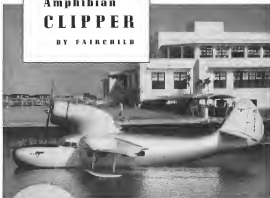
Comparing its \$1,300,000 net passenger Feb. 1, United set an estimate on its 1936 traffic of 130,000,000 revenue passenger-miles. Its 1937 total had been 27,109,711, passenger-miles, 13,330,432 better than the corresponding 1934 figure. To provide for such an increase in traffic as well as to make possible non-stop services in other directions between

## Calendar

MAR 25, June 1—International Aero Exhibition, Stockholm, Sweden.  
June 15-July 1—Livestock, General Aviation, Farming Convention, Seattle, W. T.  
June 14—National Air Traffic Convention, OMA.  
Oct. 20—Trans-Atlantic Air Race.

stated that notwithstanding the experimental flights above mentioned, a certain number of demonstration trips across the North Atlantic with the new Zeppelin airship will be operated, as heretofore arranged."

## Amphibian CLIPPER BY FAIRCHILD



Fairchild's Greater Amphibian Clipper in service. Brantiff air service by Pan American Airways on the 107-mile Jacksonville, Fla. route.



PERFORMANCE—round and low high velocity value—actual annual loads in the Fairchild "51" Amphibian, for passenger and cargo transport, private ownership, coast patrol, military movements and transport of personnel. . . . Extreme aerodynamic and structural refinements result in a useful load capacity of 40%; of the 10,500 lb. gross load! 6 to 11 passengers with 810 to 350 lb. of baggage; 2 pilots and 200 lbs. of reserve, are carried at 150 m.p.h. cruising (at 5000 ft.) for 600 miles. Top speed 175 m.p.h. As a cargo flying boat the range is 2,000 miles with 2 pilots, radio and half a ton of cargo. . . . A hull completely developed specially—complete equipment for day and night operation over land or water—maximum important refinements in design and construction resulting from the extensive operating experience of Pan American Airways, designed for service of single engine Amphibians. Available with 750 h.p. Wright or Pratt & Whitney engines. . . . Complete data and cost analysis for any specific service will be gladly furnished FAIRCHILD AIRCRAFT CORP., Hagerstown, Maryland. Division of Fairchild Aircraft Corp.



BABY CLIPPER

made at Miami can now be service on the Pan American route from Miami, Miami, or the Atlantic to Miami. A major step in this field and Whitehead Brantiff's complete line to be delivered under his service as another Pan American route along the Atlantic River to China.

# FAIRCHILD

AMPLANES • CAMERAS •  
INSTRUMENTS • AERIAL  
SERVICES • RANGER ENGINES





New York and Chicago, United announced last month it would order six of the new Douglas 24-passenger transport.

TWA has released news that it has been negotiating with the Radio Corporation of America in experiments with the automatic transmission of messages between the various radio stations in Chicago and Kansas City. After further tests it is planned to test installation of such equipment in some of the line's planes. *Advances*! Typewritten or script messages would be automatically received, relieving the copilot of considerable labor, even during the reception of long weather reports.

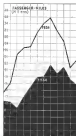
The I.C.C. last month upheld payment for Air Mail Route No. 31 operated by the National Airline System. New

ates (up to 300 ft.) from St. Petersburg and Daytona Beach 20 cents per mile; from St. Petersburg to Jacksonville 20 cents per mile.

American Airlines last month issued a new set of passenger maps consisting of a large map showing the entire airline net work and thirteen separate strip maps for different sections of its over 6,845 miles of routes. It announced the opening of a new school in Chicago for training company personnel based on its experimental school for traffic advisors recently conducted in New York. Finally it announced an additional order of two more big Douglas, bringing its total to twelve 24-passenger day planes, and eight which will be convertible to sleepers. Its total investment in these ships will represent \$2,500,000.

## Traffic

Latest available statistics from the Bureau of the Commerce and the Post Office Department—Domestic Airlines only



possibility of a repetition of such accidents under like conditions should be reduced to a point which may be considered as acceptable in comparison with the practice of world service, . . .

For the big rigid types this immunity from further casualty would require:

1. Design to the point of the most recent and latest of world construction.
2. Design to the point of the most recent studies and advances in typical aircraft construction.
3. Investigation of aerodynamic loads (as based on 142 approved aerodynamic theory) (a) formula of wind tunnel research and experience with actual ships. (b) latest advances in aerodynamic practice.
4. Construction under conditions . . . which will insure the highest and most conservative action in the design.
5. On completion of the structure build representing the complete ship, some reasonable compromise between safety and cost sufficient to permit the taking of single ship results as all ordered orders . . . up to such factoring conditions approaching the most service to be obtained.

6. When delivered by service facilities for general passenger service and represented in the handling of ships . . . designed into an extremely conservative limit in the most recent advances in construction practice. . .

Regarding landing design and maintenance of the present line . . . compared with the situation in 1928 . . . there is a large amount of additional personal experience available. . . This includes . . . experience with the Alouette and Macon for 5,227 hours . . . the experience of the Grand Zepplin, for during the past six years aggregating some 11,666 hours. . .

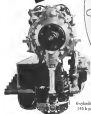
In view, therefore, of our expressed opinion, it is our recommendation (by

the Navy Department should continue with a positive carefully considered program of strictly construction, including construction and rigid ships of rigid construction as a service requirements night, altitude and extending to a ship or ship of large size, to the point, at least for the time, of forwarding ground for definite conditions regarding (here) security for world naval service. . .

We further recommend most strongly

## RANGER AIRCRAFT ENGINES

60% less frontal area than corresponding radial types, greatly reduces aerodynamic drag—increases range of vision



6-cylinder  
350 h.p.



12-cylinder  
550 h.p.  
400 h.p. net  
for export

THE RANGER ENGINE is the answer to America's demand for an efficient, smooth-running, no-loss power plant. . . Underbelly installation of the inverted Ranger Cylinder, without pushrods, no crossheads which does away with the need for regular valve adjustments and provides a constant bath of oil for the entire valve mechanism. . . Exposed and accessible valves driven from the exhaust balance of the 6- and 12-cylinder inline designs. The Fairchild patented Pressure Drive, a flexible machinery shaft, drives the magneto, supercharger, pumps and valve assemblies, insulating them against shock and vibration. As a result, a wholly new reliability is given these units. . . Ranger Engines are built for dependable service over periods of 400 to 500 hours without adjustment and with no constant except for gas oil use. Write for complete literature.

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# FAIRCHILD

AIRCPLANE • CAMERAS •  
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that the first large airport built under such a program should, at least for a time, be considered not an adjunct to the Post but rather a flying laboratory or flying training ship, not only for extensive technical observations of the structure under operating conditions, but also for displaying our knowledge regarding the best conditions of service for such routes, and, as well, for giving opportunity for the training of pilots and crew.

Just how much weight would be given the report by the Navy Department was not apparent last month. Secretary Bennett, if in a Washington hospital, refusing to leave a sickroom.

Soon after the report's release, however, Representative Hatcher introduced a bill calling for the immediate construction of two rapid airplanes, one for training, one with metal hull "of such size as the state of the art will permit."

## Science Session

Institute of the Aeronautical Sciences holds fourth annual Post meeting, Martin new president.

An aviation attendance of 150 members attended the three-day annual meeting of the Institute of the Aeronautical Sciences, held Jan. 28-31 at the Fayet Physical Laboratory of Columbia University. Following their new traditional papers—presented short papers on morning program, broad afternoon discussion of basic subjects—the daily program proved stimulating and informative. Outstanding were the afternoon discussions of recent power plant trends, of aerodynamic progress, of contribution into the problem of transatlantic flight.

On the afternoon of the first day the members were sent location session to short officers for the coming year. Re-

sults: Given L. Martin succeeds Donald Douglas as president, Vice-president for the coming year is Dr. George W. Lewis, Chas. L. Rogers, Dr. Clark McPherson, Eugene E. Wilson and E. L. Allen. Sherman H. Fairchild will serve as Treasurer, Maj. Lewis D. Gardner will continue as secretary.

During the evening of the first day members met for the annual dinner at Columbia's Faculty Club. Three Speech-

es were given, the first by Dr. Gardner, followed by Dr. Fairchild, and then by Dr. Lewis. The evening was a success. The annual dinner was a success. The evening was a success. The annual dinner was a success.

## Giro's Return

A roadable, direct-control, wingless means completion. To mount jump-off device later.

For over two years now, ever since Giovanni Giro announced the appearance of production on the fixed-wing type of airplane, progress followed in the research program underway at the Wilbur Giro factory has been rather scarce. A year ago Americans described the small direct-control cabin gyro the Aerojet Corporation of Azusa has used for a trial-burn in developing direct (flying) control, and jump take-offs. In December we gave a detailed description of the Koffert direct-control hub mechanism. We have also carried a description of the amazingly developed Koffert direct-control gyro described to the Air Corps.

But not until last month was release obtainable on the details of the new available, direct-control gyro showing completion for the Bureau of Air Commerce which, now equipped with the jump take-off device, promises to be the prototype for the next gyro to be put into commercial production.

It is indeed a far cry from the old fixed-wing type. The principle underlying its design was aerial rider operation that we can give it here. What follows is merely a sketch to serve as

sketches of the revolutionary little craft. A small steel-tube cabin fuselage carrying two persons side by side, its overall length (20 ft. 7 in.) somewhat shorter than that of a single-engine airplane. No trace of wings. The empennage control surfaces reduced to its end stabilizer assembled into a single stabilizer unit, and a small auxiliary rudder.

The engine, a 90 hp. Pumper Cascade, is mounted inside the cabin behind the seat where it is cooled by a streamer fan fed through louvers. From the rear of the engine an over-running gear and a clutch mechanism drives a shaft connected to the single rear wheel. From the front of the engine another shaft runs forward between the seats to a small selector gear box, which permits the engine to be: (1) disconnected from the propellers (two of them rotate in opposite directions to eliminate torque); (2) connected to the propellers alone or (3) connected to the rotor alone.

On the floor of the cabin are pedals through which the pilot can control the two fully variable and hinged front wheels. From the cabin roof hangs the control stick through which the rotor is tilted and which has a nonreversible-type gyro-fusible connected with the engine.

Details of the jump take-off mechanism are not yet available, but it consists of a hydraulic device which bends the blades to a zero-lift incidence, permitting the rotor to be operated to a much higher rate of revolution than required for normal flight. Suddenly releasing a positive-lift pitch causes the fly wheel energy then stored in the rotor to tilt the ship 20 to 30 ft. vertically from a standing start.

Allow the cabin three blades join in the hub which is supported on a two-strut non-beared pivot. They can be easily folded and unfolded on the empennage.

Descriptive specifications: Landing speed (under full positive control) zero. Top speed (on the highway) 25 m.p.h. Top speed (in the air) 115 m.p.h. Gross weight 1,350 lb. Storage dimensions 24x4x4.

## Blue Sky versus Proven Performance

Written and verbal statements of quality and service are usually considered the most logical as just conversation—"blue sky."

The only sure way to determine the facts about Sumner's quality is to give it a fair trial in your own plant.

The only sure way to determine the facts about Sumner's service is to give it a fair trial.

We are ready to stand on our record and if you are not using Sumner's taking you have every reason to feel you will find Sumner's service and quality not a lot more than just "blue sky."

Replacement and delays are costly. You can cut costs with Sumner's taking. We cover you to make a replacement.

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BRIDGEPORT, NEWTON CO., PENNSYLVANIA



**HIGHWAY AND SKYWAY**

see both open roads in this new gyro meeting completion by the Douglas Company of America for the Bureau of Air Commerce.



## Menasco, Ryan Busy

**John Menasco, California, teams with order backlog.**

With all the big military and transport manufacturers in the West Coast jockeying ahead to new year-end peaks of activity, some of the smaller coast units have seemed lagging in comparison.

Look south, however, two of them, Menasco of Los Angeles and Ryan of San Diego, thrived into the last season.

A. S. Menasco announced a backlog of \$1,000,000 orders on hand for 73 engines representing a total of more than \$100,000 of business, and standing approximately equal to the entire 1933 production.

Outstanding Menasco orders: Hammond (builders for the B, of A.C.), Lockheed (engine for transports), Deane (power), Grumman Aircraft (two-engine Grumman), and the Ryan (ST).

The last named made quite a splash last month on its own account—the acquisition of the assets of Ryan of 31 near dead-headed sport makers in W. St. Louis, Atlanta, Ga., operator Ryan was delivered immediately. Five years due to follow before the country's production of the rest was to be reached for March and April. For these and other orders on hand Ryan has ordered 25 Menasco for the first half of the year.

## Maneuvers

**Navy, Marine and Air Corps experiments work at problems.**

A widespread program of aircraft maneuvers marked the service search just passed.

In New England the GPO put 50 biplanes, attack, pursuit, planes through two weeks of intensive maneuvers under severe winter conditions. Fighting started in Mitchell Field, at Fort Belvoir, N. H., and continued on to Washington, N. H., against persistent defense from those states. More important, the Corps based at its campsite, its engine testing technique, and its service squadron encouraging efficient design the handling of the new zero temperature.

Over the California, 50 Marine Corps planes outlasted exercises from bases at Fort Bragg, on the Island of Oahu and at St. Thomas in the Virgin Islands, until mid-February, then began the long return flight to their home base at Quantico.

Thirty-one of the Navy's patrol planes under the command of Rear Admiral P. J. Harbo, who accompanied down on the tender *Maneuver*, took off Feb. 7 for a week's maneuvers off Columbia and

San Diego and around the Galapagos Islands.

On Feb. 30, the fleet sailed at San Diego, including the carrier *Lewington*, *Stratford* and *Lewington*, moved on to San Francisco for a two-day cruise off the California coast.

In Washington the Navy Department announced the launching of the 3000-ton carrier *Yorktown* on April 4, the launching of the *Kalamazoo* in August. Both are under construction at Newport News, Va.

Meanwhile the House of Representatives and the Senate's \$243,342,000 Army appropriation bill, the record in the country's peace-time history. Most important—increased from \$1,000,000,000 to \$1,400,000,000 for aircraft production. The number of planes to be bought is set for 365.

## Buffalo Shuffle

**Consolidated subsidiaries work to Bell Aircraft Corporation.**

Last year when Consolidated Aircraft moved across the continent to San Diego, the city of Buffalo which had been its home for a decade suffered considerable changes.

Then Lawrence D. Bell and Ray P. Whitney, former Consolidated executives, formed local capital as a move that made up for part of the displacement. Joining the Bell Aircraft Corporation, they announced, they had leased a portion of the vacant Consolidated plant and would employ at least a portion of the workforce. Consolidated could not afford to move to the Coast. Soon they had secured a \$80,000 contract for Air Corps experimental work.

Last month they announced a further contract. To help speed production on at the Navy patrol boat order, Consolidated had started the construction of 73 sets of 1071 engine using parts back to Bell Aircraft. Responding \$100,000 of business, the new order will require an immediate expansion of the Bell plant to a full half of the old Consolidated factory, a Bell payroll of 300 workmen.

## Mid-West Reports

**Carlin Wright, Cooney and Beechcraft issues.**

FEB. 1. The Carlin Wright Aircraft Company of Lincoln, Mo., announced it would increase its force of employees from 10 to 250 men. Carlin Wright reported had ordered new 175 hp. primary owners for immediate production.

Cooney announced the appointment of E. W. D. Grant, manager of the Storer Air Service and S. L. Turner, British

plot, as London agents for its aircraft now in active production. As a first order the new agents took delivery last month of a C-34 which Turner plans to enter in the Egyptian air races March 15.

Meanwhile Beechcraft turned one of its 420 hp. models to New York which it was taken down and crated for shipment to France. Beechcraft's Beech Dredger, French commercial pilot.

## Financial

**Douglas, Northrop, Lockheed, United Aircraft, North American and Irving all report 1933 profits.**

Irving Air Corps Company, Inc., of Buffalo, reports for 1933 a net profit after charges and federal taxes of \$135,376. The corresponding figure for 1934 stood at \$179,726.

North American Aviation, Inc., recently located in a new factory at the Los Angeles Municipal Airport, reports for 1933 a net profit of \$14,338 after depreciation and other charges on a total profit of \$133,383 realized from the sale of aircraft. A net profit of \$226,422 after a security sale profit of \$1,241,280 was reported for 1934.

Revolving the last year in the company's history, the annual statement of the Douglas Aircraft Company reports net profits of \$1,362,932 (\$270 a share) for 1933; an operating profit of \$1,551,534 reported with an operating profit of \$2,552,512 in 1934; an increase in assets of \$1,068,750 to a total of \$6,653,176; 1933 sales of \$7,261,896; certified orders of \$1,680,800.

The Northrop Corporation, 11 per cent Douglas owned, was listed as carrying certified orders of \$4,900,000 and showed 1933 sales of \$5,195,237 with a net profit of \$172,321.

Lockheed Aircraft Corporation reports for the year 1933 net profit after depreciation, taxes and charges of \$27,386 (\$6 cents a share) compared with a net loss of \$190,895 for 1932.

Liquid Aircraft Corporation and subsidiaries report for 1933 a net profit after taxes and charges of \$144,635 (30 cents a share) compared to a net loss in 1934 of \$27,027. Lockheed orders needed \$12,800,000 against \$7,233,000 at the end of 1934. Included in the year's profit were \$90,598 from repairs, \$138,500 payments from sale of surplus and maintenance rights, and \$20,832 profit from the sale of Pan American Airways stock.

Last in January the United Board of Directors called a special meeting of stockholders for March. Owing to the year's proposal to issue 3,000,000 shares of \$1 par value stock to raise capital for increased production, and to salvage plant facilities at Burbank, Los Angeles, and at Hawthorne, Los Angeles, and at Van Nuys.



Front View  
THERMOCOUPLE  
INDICATOR



Front and Back View  
AIRCRAFT SWITCH



Front View  
CABLE ACTION AIR  
TEMPERATURE INDICATOR



Back View  
THERMOCOUPLE  
INDICATOR



ABSOLUTELY  
New



Front View  
PORTABLE POTENTIOMETER



Back View  
CABLE ACTION AIR  
TEMPERATURE INDICATOR



Front View  
IN-POSITION SWITCH



Back View  
IN-POSITION SWITCH



Garret Type  
THERMOCOUPLE



Front View  
CABLE ACTION AIR  
TEMPERATURE INDICATOR



Generator Type  
THERMOCOUPLE



FLIGHT TEST AND



AIR TEMPERATURE BOLT

STAND EQUIPMENT



1 WE WILL SHORTLY ANNOUNCE A COMPLETE LINE OF HIGH FREQUENCY EQUIPMENT FOR AIRCRAFT. THIS WILL INCLUDE GAS ENGINE ALTERNATORS, MOTORS, TRANSFORMERS, RECTIFIERS, HEATING AND COOLING EQUIPMENT.

1. ALTERNATING CURRENT HIGH FREQUENCY POWER IS THE ONE LOGICAL SOLUTION TO THE TRYING AIRCRAFT ELECTRICAL POWER PROBLEM

1 IN ORDER TO AID THE INDUSTRY IN FAMILIARIZING ITSELF WITH THIS VITAL IMPROVEMENT WE HAVE PREPARED A DIEST OF ELECTRICAL POWER FOR AIRCRAFT. THIS IS AVAILABLE TO EXECUTIVES, CHIEF ENGINEERS AND DEPARTMENT HEADS OF ESTABLISHED AIRCRAFT COMPANIES.

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- Today used by 90% of American transport planes.

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## AIRPLANE FIRE SYSTEM

*For descriptive statistics, visit*

Walter Kohn & Company, 145 West 61st, New York, N. Y.



● Not possible, but LUT carbon-dioxide sensor available, for evaluation only.

**ALABAMA**—BREWSTER and MANNING have recently had their proposed new plant approved by the Bureau of Air Commerce for allocation of \$17,000 and \$34,263, respectively, for WPA improvements. The Birmingham-based firm has already been awarded a contract for the construction of a building and a hangar at the Birmingham Municipal Airport. W. H. Seay, vice president of the firm, will handle sales of the new plant in the southern states. Other projects in progress include: (1) TUCKERMAN, DRYDEN and TUCKERMAN are planning early enlargement and improvement of their airports at Birmingham, Montgomery and Mobile; (2) R. L. Leonard has offered 40 acres of land near the Mobile airport for a new terminal building; (3) The University of Alabama is planning to purchase a site for a municipal airport at UNIVERSITY. Present plans call for moving the shop equipment of the University of Alabama from its present location to the new shop where it is completed.

● **ARIZONA**—A fleet of planes of the Phoenix Flying Club, led by Capt. Edward Petrus, flew to Naples for use of its monthly air picnic early in February. ... A \$69,951 improvement project for Douglas International Airport has been approved by the Bureau of Air Commerce. It now awaits approval by the state WPA. ... Childs E. Hays, of Douglas, has been elected state president of the National Business Association for BOC. ... Phoenix is receiving the appropriation of about \$2,500 to increase between \$50,000 and \$100,000 from the WPA for office of runway at Sky Harbor; the municipal airport. Tucson has received \$100,000, Sierra Vista, \$17,000, Winslow, \$25,000, Prescott, \$12,000, and St. Johns, \$1,000.

● **ARKANSAS**—The WPA has granted \$75,191 for the construction of two 3,000-ft. runways at LITTLE ROCK Municipal Airport. The city will add \$55,430 to this, which will include 16,000 yds. of crushed stone. The State Highway Department will construct about 2 miles of roads in the vicinity of the field. —  
LITTLE ROCK Municipal Airport Manager S. A. Friedman, ill for several weeks at Hot Springs, returned to his job in good health in January.

●**CALIFORNIA**—The Boeing School of Aeronautics, Charles M. Keel Airport, placed 114 graduates in jobs during the year 1915, according to T. Lee, Jr., general manager of the school. . . .

[illegible]

● **COLGADO**—Colombia members at the Venezuelan Association for the Development of the Viracayacu area (ASAVIR) met last week in Bogotá to discuss the project. ASAVIR is a 25,000-acre area in the Viracayacu National Park, 25 km. from Bogotá. The project is a joint venture of the Air Transport Development of the State Planning Commission, ASAVIR, and the State Aeronautics Commission. It has launched a comprehensive aviation development program for the area. The plan calls for the construction of a new airport, a new terminal, a new control tower, a new emergency landing field, improvements to at least eighteen existing fields, and modernization of nearly 3000 buildings throughout the state. The program is expected to take three years. Among towns where the commission plans to establish new airports are Yopal, Fúquía, Bogotá, Medellín, Rios Pasca, Bucaramanga, Ibagué, and Armenia. ■

●CONNECTICUT—The WPA has awarded \$20,437 for improvements at

Boys' Field, Hattiesburg. A new administration building will be erected which will include all entire control room with facilities for controlling fans, stage and heater lights. Flying instruction has been added to the curriculum of the Charles E. Jones Sr. School, New Orleans. Howard Chapin will be the flight instructor. Richard Markley is chief instructor of the school. . . . All transport and student flying at the University airport has been taken care of by the Civilian Control Authority. Civilian private flying has been kept at the field by varying places, time, etc. The field is being completely reworked and leased for a period of twenty years. Mason Jennings, who has a flying school, will have these planes at the field. It is expected to ask another licensee for the airport.

• **DISTRICT OF COLUMBIA**—The dispute over the use of Military Road as Washington-Reagan Airport is still unsettled. Although Samuel J. Salomon, manager of the airport, threatened to remove the guards along the road by Feb. 15, a compromise agreement was reached by that date. The guard will be continued pending legislation by Congress to determine whether or not the road shall be closed. As the road is public property, congressional action is required before it can be closed to public use.

**FLORIDA**—At Ft. Lauderdale Elder Field, LAMARCA traffic is now regulated by the Department of Commerce rules. The airport, managed by Dick Swisher, is having an eighteen-plane fleet controlled by the FAA.... In Gainesville, the Federal Aviation Administration at the University of Florida, Gainesville. The course is a WPA program under the direction of C. R. Smith, director of the Center for the first commercial flight from San Francisco to Tampa, 22 years ago. Sidney C. Brown, president of the Tampa Chapter of the National Aeronautics Association, will lead the flight. The flight will consist of seven DC-800 aircraft, which drew \$1800 spectators.... The City Council of West Palm Beach has agreed to build an airport share with WPA funds. George B. Givens, chairman of the committee, said that the city of Sarasota is giving flying instruction and expects to charter work. Guy Hahn, Jr., is in charge, with the assistance of Nelson Jones as airplane instructor mechanic. For student instruction, the school was set up.

via Sparhawk while for charter trips a 4-place Stinson will be used. Offices are being built at the north end of the hangar.

●**GEORGIA**—The Savannah chapter of the National Aeronautics Association is planning to sponsor an air show at the dedication of the reconstructed Hunter Field. The work is expected to be finished next fall. The \$64,254 improvement program calls for construction of a concrete and steel hangar 450x120 ft and three taxi and asphalt runways. The main runway will be 3,000 ft. long and 150 ft. wide.

●**IDAHO**—The Blaine City Council has agreed to apply to the WPA for a grant of \$144,441 for improvements at Blaine Municipal Airport. If the application is approved, the field will be graded and drained and a 50x60 ft. concrete-slab hangar will be erected. . . . Subject to WPA approval, the Bureau of Air Commerce has approved airport improvement projects for the following towns: Astoria, \$9,282; Coalinga, \$5,000; Chicago, \$25,562; Painesville, \$9,282; St. Anthony, \$19,543.

●**ILLINOIS**—Parks Air College, East St. Louis, has spent more than \$60,000 on an expansion program in the past three months. This has included remodeling of buildings and purchase of new equipment. . . . Manager Phil Volmer of Marine Airport, under title to January before the Illinois Rotary Club. The topic was "Aviation and the Expansion of Airports." Aviation motion pictures were also a feature of the meeting.

●**INDIANA**—The Chicago City Council Aviation Committee is seeking a way to let Chicago Municipal Airport be used for testing railroad trucks. It is believed that if the Board of Education, which owns the airport site, would give the railroad a new right of way along one

edge of the field, the trucks could be moved at a total cost of about \$300,000.

●**INDIANA**—Bear Field, Fort Wayne, will have a radio range beacon and boundary lights installed as a WPA project. . . . Brown city commissioners at South Brown have asked to supply additional money. St. Joseph County Commissioners are considering the purchase of South Municipal Airport without the cooperation of the city. They hope to be able to purchase the 430 acres for \$99,000. . . . With Lloyd Owen's purchase of a Waco, Bear Field, Fort Wayne, has located plans in its hangar. . . . H. Wer Cook, Indianapolis, has been elected vice governor of the National Aeronautics Association.

●**IOWA**—The Des Moines City Council has granted Art Thomas, manager of Des Moines Municipal Airport, real service rights to the job because of the length of his service. He has been at the airport for six years.

●**KANSAS**—The Naval Reserve Aviation Base at Fort Leavenworth, Kansas City, is doubling its hangar space. The base has built away the third hangar from the north end of the field, the city paying \$200,000. Under the new arrangement the two hangars at the north end of the field will be used, the city paying \$300 of the rent and the Navy paying an additional \$200 and \$10,000 will be spent remodeling the hangars.

●**KENTUCKY**—Harry Rogers, manager of the Henderson Airport, is sponsoring the formation of an aviation club there. . . . Erle McGuffey and Ernest Webb of the Louisville Air Taxi Company are tentative establishment of a "Rider's" line operating from Cincinnati via Lexington to Middlesboro, Knoxville and Chattanooga. If plans go through, the line will be known as Cumberland Airlines, Inc.

## AVIATION March, 1936

●**LOUISIANA**—The Aviation Committee of the New Orleans Association of Commerce, acting under the chairmanship of President H. LaBelle, will work for the establishment of an air mail, passenger and express line between New Orleans and Mexico, capital of the state of Yucatan, Mexico.

●**MAINE**—The Airmobile Aircraft Co., of Lewiston, has been incorporated for \$20,000. Henry M. Driscoll is president and treasurer, and with Leslie M. Driscoll and Orr M. Driscoll, comprises the board of directors. . . . Driscoll has a private field near his home at Young's Corner, Auburn.

●**MARYLAND**—The state PWA has approved an application for \$1,200,000 to complete the national airport project at Baltimore. The city already has an \$800,000 balance from a PWA airport loan. The field will reach 1,000,000 sq. ft. of land 63 ft. If the application is approved in Washington, work will start early in the spring. . . . The mayor and City Council of Baltimore have approved construction of a 10x100 ft. hangar to cost \$10,000. The plan requires approval of the Federal Aviation Corporation, which would pay the city rental equivalent to 6 per cent on the city's investment for a period of five years.

●**MASSACHUSETTS**—The second annual New England Intercollegiate Flying Conference, meeting in February at Amherst College, voted to change its name to the Association of New England College Flying Clubs. The Amherst College disapproval is a possibility to be accepted later as a challenge trophy. The conference voted to hold its second New England intercollegiate meet at Worcester, Mass., May 9. . . . Irving Johnson and Frank P. Gellman have organized a company at Boston Airport for the emergency supply of tools and parts.

## AVIATION March, 1936



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●**OKLAHOMA**—The Muskogee City Council has provided \$5,000 for drainage, installation of runways and a hangar at Muskogee Municipal Airport. . . Tulsa has been granted \$60,000 by the WPA for construction of runways at the municipal airport. . . The WPA will construct an \$80,000 hangar at Okmulgee City Municipal Airport.

●**OREGON**—Portland voted in January for a \$300,000 special bond issue for purchase of a site for a medium-sized land and sea port. The WPA has given assurances that up to \$500,000 will be spent for development. . . Students of the Commercial Aircraft Company, Inc. and the Oregon Institute of Technology's Aviation School, Seaside, Ind., have completed work on a 1-1/2 mile runway at their own district. It was built under the supervision of Eugene Latorre, instructor of the Institute, and Victor St. John, vice-president of the Commercial Aircraft Company. It is now ready to undergo flight tests. . . The WPA and the State Board of Agriculture are planning a general school course at Cannon City. Classes will be held once a week, and will be instructed by George J. Halfway. Other cities which will have similar ground schools are: Portland, Manassas, Alaska, Chehalis, Clatskanie, Hood, Eugene, Clatskanie, Clatskanie, Eugene and Milwaukie.

●**PENNSYLVANIA**—The Allegheny-Bethlehem Airport has received \$40,000 from the WPA for grading runways. The money is part of a \$250,000 total to be spent at the field. . . The Wyoming Valley Flying Club added 20 new members at a meeting in February at Wilkes-Barre, Wyoming Valley Airport, Olean. . . Joseph C. Jernett, president, Thomas Berry, vice-president, and Harold secretary, and William Knoch, treasurer. . . Richard F. Ross of Lawrenceville was awarded the annual trophy of the Lak-

eland Aero Club late in January. The trophy is awarded to the local pilot who with the greatest number of flying hours and who is judged to have done the most extraordinary work in the aviation arena. Rossy time was 75 hours, 23 minutes.

●**RHODE ISLAND**—Wings, Inc., which operates a passenger and charter service at the Rhode Island State Airport, Pawtucket, has purchased a 225 hp Jacobs powered engine plane. Wings

●**SOUTH CAROLINA**—The State Arrangement Commission has decided to lay a plan, which will be available to all state departments for official business. The plan will be paid for from proceeds of the tax on aviation gasoline which are set aside for the support of the commission. . . Beverly E. Howard has assumed command of the Charleston Flying Service and is the new manager of Charleston's Municipal Airport.

●**SOUTH DAKOTA**—The Sioux Falls City Commission has been advised by the Mayor's Airport Committee to lay the 1,500-acre Sioux Falls Municipal Airport. The Committee also recommended acquisition of adjacent land to the south of the present site to allow extension of the runway to 3,000 ft.

●**TENNESSEE**—The WPA will erect two new hangars at Nashville Municipal Airport. They will cost \$20,000 each and will be about 120 ft square. . . Edward Shock has replaced Webb Kautz as manager of Louisville Municipal Airport, Kentucky.

●**TEXAS**—Richard H. Charlie has taken a two-part lease on the El Paso Municipal Airport. . . South-Hemlock, Inc., has accepted a plot at Lone Field, Dallas' municipal airport. The company is headed by Edward F. Booth, who has operated at Lone Field for six years, and Harold P. Hanning, who was formerly with the Texas Company. Prop-

osed for acquiring planes and instruments has been cancelled at a cost of \$25,000.

●**UTAH**—Cannon County and the city of Logan are planning common and improvements to two runways, erection of a beacon light and markers at Logan-Cannon Airport. The WPA has allocated \$10,000 for the project.

●**VERMONT**—Exclusive of the regular daily and planes of Central Vermont-Indian & State Airways, 225 planes landed at St. Albans Municipal Airport during 1935. Field manager Harold W. Pugh, with the assistance of Robert St. John, carried 1,913 passengers during the year.

●**VIRGINIA**—Aviation enthusiasts of Charlottesville have formed the Charlottesville Aero Club to increase interest in aviation in the vicinity and to work for an airport for Charlottesville, Orange & S. Turner, St. president, Whelan Club, vice-president; Edward Sullivan, secretary and treasurer. The club has seven active members and thirteen honorary members.

●**WASHINGTON**—Miss L. Hawn, president of Northwest Air Services, Inc., Seattle Field, has offered the field to Seattle for development as a municipal airport base for \$25,000 in cash and city property appraised at \$25,000.

●**WEST VIRGINIA**—The Harrison County Chamber of Commerce has voted \$1,175 out of a necessary \$2,625 toward purchase of the Huntington-Grafton airport site. If the money is raised, the site will be purchased and title transferred to the Lexington County, Board of Commissioners, as this application may be made for WPA funds for site improvements. . . The Logan Flying Club, West Field, Charleston, has purchased a Taylor "Cub."



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for Western districts of Lone Field, Dallas, Tex., and South-Hemlock, Inc. Also to agent Edward F. Booth, previously Miss Warren Field, representing Edward F. Booth, vice-president, Thomas Berry, vice-president, and Harold P. Hanning, secretary, and William Knoch, treasurer. . . Richard F. Ross of Lawrenceville was awarded the annual trophy of the Lak-



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# Aviation People

• From Gen. WILLIAM LAMSON (Brace) Mendenhall, commander of the United States air force in France during the World War, died Feb. 19 of a heart ailment.

An army officer since the Spanish-American War, Gen. Mitchell was one of the first in the service to be fired with the military penalties of a court-martial. In 1914 he was graduated from the Wright flying school. Three years later he was on leave in Spain when Austria entered the War, a circumstance which permitted him to enter active service almost at once. Serving first as assistant to Gen. Maxime M. Fournier in the task of building up an A.E.F. Air Service, Gen. Mitchell later succeeded to the top command serving as Chief of Air Service, Zone of Advance, Chief of Air Service, First Corps, Chief of Air Service, First Army and Chief of Air Service, Group of Armies. In the last named post he was instrumental in the development of an independent air arm, much along the lines of our present G.H.Q. air force. For his war work he was awarded the Distinguished Service Medal, the Croix de Guerre with five palms and several other decorations.

Returning to the United States after the Armistice, Gen. Mitchell was immediately named Assistant Chief of the Air Service. Filled with enthusiasm for the new arm, he soon became an outspoken and ardent critic of the slow pace at which the country's air defense was being developed. In 1921, after army leaders took long over-optimistic view of the Virginia coast, he became more convinced than ever that men were obsolete, that a separate air force was the only practical solution of our defense problem.

At the end of his regular tour year as chief of duty at Aviation Club, he was reappointed to that post. Instead he was ordered to his regular army grade of colonel and sent to Texas. He had been there only a short time when he issued his now famous statement charging the high command with "incompetency, ineptitude, criminal negligence and almost treasonable administration."

Mitchell was promptly court-martialed, found guilty and sentenced for five years without pay or allowances. President Coolidge reviewed the sentence, upheld the suspension but restored the allowances and let him go. Within six weeks Gen. Mitchell resigned from the army.



Gen. Lamson



J. W. Gossard



J. B. Gossard



J. B. Gossard



since 1916. Collett's brilliant work in that field has been internationally famous for a decade. In 1935 the Hamilton Standard Company was awarded the Collet Trophy for the considerable work popular he had done for them.

• JAMES S. GOSSETT has been appointed vice-president and general manager of the Fairchild Aircraft Corporation. Long prominent in the management of important business concerns in this country and Canada, Mr. Gossett comes to his new position from the post of vice-president and controller of Western and Bureau, Inc., Detroit, manufacturers of high-speed drills. He will have charge of all activities of all the Fairchild subsidiaries which include the Fairchild Aircraft Company, the Fairchild Aircraft Corporation, Fairchild Aerial Systems, and the Ranger Engineering Corporation.

• One of the country's leading experts on airport and airplane lighting, a World War flyer and an officer in the Ohio National Guard, Lt. Col. Vernon Lee Jan. 18 at his home in Cleveland, Ohio. He was a graduate of the University of Texas, and had been for the past fifteen years a member of the localities of the Army Department of the General Electric Company, first at Minneapolis, then in Cleveland. For the past several years in the research laboratories at Ohio State.

• The board of Air Corps officers appointed to select the 1935 winner of the "Corps" Chasing Medal "for the officer who obtained most ... performing the outstanding act of valor, courage, heroism, self-sacrifice in a hazardous or dangerous situation in connection with flying" awarded no difficulty in their task. By unanimous verdict, and with the most glowing praise, they bestowed it upon Lieut. Homer K. Gossard of Lexington, Ky., who rescued Major Philip F. Hines and Lieut. T. W. Hines, Jr. from the burning wreckage of the long-engined Boeing bomber which crashed at Wright Field Oct. 20. In the wake of the War Department's decision, when Lieutenant Gossard arrived at the scene of the accident, he immediately climbed atop a wing of the burning airplane and made his way to a window of the cabin through which he extracted Mr. T. W. Hines. In spite of









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